MINUTES OF THE MEETING OF THE NORTH CENTRAL CORN BREEDING RESEARCH COMMITTEE
1958

Reported by
G. F. Sprague, Secretary

Crops Research Division
Plant Industry Station
Beltsville, Maryland
CR23 April 1958

TABLE OF CONTENTS

NORTH CENTRAL CORN BREEDING RESEARCH COMMITTEE

Minutes of the meeting held in the Illini Room of the LaSalle Hotel, Chicago, Illinois, March 4-5, 1958.

MORNING SESSION, MARCH 4

The meeting was called to order by Chairman Grogan at 9:30 a. m. Following introductions, the first order of business was to elect a new Secretary. It was MOVED and seconded that G. F. Sprague be given this assignment. The motion was carried. The Chairman then instructed the Secretary to prepare a letter of appreciation to Dr. Merle T. Jenkins for his contributions to the Corn Conference covering a period of nearly 25 years and for his services as Secretary during this entire period. The Chairman then called for reports of the various committees.

ROSTER OF ATTENDANCE

Canada

Gamble, Edwin E.
Geisbrecht, John

Illinois

Alexander, D. E.
Beckett, J. B. (USDA)
Bhatnager, P. S.
Gokcora, H.
Hayes, H. K.
Jacob, M. C.
Jugenheimer, R. W.
Leng, Earl L.
Patterson, E. B.
Trifunovic, V. C.

Indiana

Brunson, A. M. (USDA)
Crane, Paul L.
Gupta, R. N.
House, L. R.
Richardson, D. L.
Ullstrup, A.J.(USDA)

Iowa

Penny, L. W. (USDA)
Russell, W. A.
Sprague, G. F.(USDA)

Kansas

Findley, Wm. R.Jr.(USDA)

Kentucky

Loeffel, F.A.

Michigan

Rossman, E. C.

Minnesota

Rinke, E. H.
Rohringer, V.E.
Sentz, J. C.

Missouri

Grogan, C.O. (USDA)
Zuber, M.S. (USDA)

Nebraska

Lonnquist, J. H.

Ohio

Dollinger, E. J.
Stringfield,G.H.(USDA)

Oklahoma

Brooks, J. S.

North Dakota

Wiidakas, Wm.

South Dakota

Shank, D. B.

Washington, D. C.

Heerman, R.M. (SESD)

Wisconsin

Neal, N. P.
Strommen, A. M.

REPORT OF THE SUB-COMMITTEE ON THE PRESERVATION OF GERM PLASM

No new additions to the preservation of Corn Belt germ plasm have been made during the year to our knowledge.

Progress of the National Research Council committee on maize preservation is about as follows:

At the last recording the total number of collections was 10,922. The races are now being described and as publications become available, the duplicate collections will be combined or discarded to reduce the number in storage.

Publications:

Collections I and II have been reported previously.
Races of Maize in Cuba. William H. Hatheway. NRC Pub. 453. 1957.
Races of Maize in Colombia. L. M. Roberts et al.NRC Pub.510. 1957.
Races of Maize in Central America. E.J.Wellhausen et al. NRC Pub. 511. 1957.

Two publications not under NRC, but similar to the 3 listed above are:

Maize of the West Indies. W.L.Brown. Tropical Agriculture 30: 141-170. 1953.
Races of Maize in Mexico. E. J. Wellhausen et al. Bussey Institution, Harvard University. 1952.

At least 7 more papers dealing with the races of maize in other Latin American Countries are planned.

G. H. Stringfield

The report was read by Committee Chairman, G. H. Stringfield, who MOVED that it be accepted.

Seconded and passed.

REPORT OF THE SUB-COMMITTEE ON THE GROUPING OF INBRED LINES FOR BREEDING PURPOSES

Last year the Committee, after the various States were canvassed, gave a complete report to include all new inbred lines. Since it appears that there is little need for a yearly revision of this list no further report is presented at this time.

It was MOVED by Dr. A. M. Brunson that the above statement be accepted as the sub-committee report.

Seconded and passed.

REPORT OF THE SUB-COMMITTEE ON CYTO-PLASMIC MALE STERILITY AND RESTORERS, INCLUDING RECENT INFORMATION ABOUT RESTORERS AND PROGRESS WITH THE FERTILITY RESTORER PROGRAM

The Chairman, Dr. Beckett, stated that the Committee had not found time to discuss this problem and no report was submitted.

REPORT OF THE SUB-COMMITTEE ON MATURITY STUDIES

Implementing the decision taken at the March 1957 meeting of the NC-2 Corn Research Committee, steps were taken to solicit the cooperation and participation of the hybrid seed corn industry for the conduct of investigations that might lead to the development of a uniform system for maturity classification in the North Central Region.

Fifteen representatives of the seed companies indicated below met with the NC-2 Committee at Madison on March 18, 1957 and agreed to participate in a series of trials in cooperation with the several Experiment Stations of the region and in Canada.

DeKalb Agricultural Association, Inc.,
Funk Bros. Seed Co.
Pfister Associated Seed Growers, Inc.
Northrup King & Co.
Pioneer Hi-bred Corn Co.

A joint committee representing the industry and Experiment Stations developed plans for 22 trials in North Dakota, Minnesota, Iowa, Wisconsin, Illinois, Oklahoma, Michigan, Ontario and Quebec. Forty-nine hybrids (19 open pedigree and 31 closed pedigree) were selected, representing approximately the 100 to 700 maturity series as used in the cooperative testing program of the North Central Region. In general, the entries were included in trials in areas where it might reasonably be expected they would be adapted. However, all entries were grown at certain of the more southerly locations.

Because of the difficulties occasioned by excessive rains, not all trials were planted as planned, and others were subsequently abandoned for other reasons. The committee circulated an outline of general procedures to be followed throughout the course of the season. These included the determination of accumulated thermal units from planting to each of a minimum of three successive harvests at weekly intervals and beginning when kernel-moisture content was about 45 to 50 percent.

Since several of the cooperators were unfamiliar with this type of trial, various difficulties, over and above those occasioned by the unfavorable season, were encountered. Consequently, the data of the 1957 series of trials apparently does not warrant any extensive analysis. Nevertheless, some general conclusions can be drawn and modifications of procedures indicated for future trials. Accumulated termal units have

been calculated from planting respectively to 50 percent tasseling, 50 percent silking and to the stage of physiological maturity as indicated by a kernel-moisture content of 40 percent, in the latter instance by interpolation where necessary.

The number of thermal units required by each strain to reach the above-mentioned stages of development in the respective trial areas varied considerably. However, in general, the strains occupied approximately the same relative position to one another. On the basis of 1957 trials, it appears that calculation of thermal units from emergence, rather than from planting, is to be preferred. This value also shows considerably greater stability than calendar days. A brief summary of 1957 results will be circulated to all cooperators.

It is planned to continue the trials in 1958, following the plans (with minor modifications) used in 1957. The importance of all cooperators following the same procedure for the harvesting schedule is emphasized.

The Committee believes that cooperative trials of this kind, involving both industry and station workers, are most valuable especially as regards the current studies on maturity, which is of prime significance in the northern tier of states.

The Joint Committee

Representing Industry:	NC-2 Representatives
R. N. Rasmusen, DeKalb Agric.Assoc.	E. R. Leng, Ill. Ag.Expt.Sta.
Carl Longenecker, Funk Bro. Seed So.	E.C.Rossman, Mich." " "
W. J. Leary, Northrup King & Co.	E.H.Rinke, Minn. " " "
M. L. Brawner, Pioneer Hi-bred Corn Co.	Wm. Wiidakas, N.Dak. " "
W.R. Reed, Pfister Assoc., Growers	N.P.Neal, Wisc. Ag. Expt.Sta. (Chairman)

The Committee report was read by Dr. Neal who MOVED that the report be accepted.

Seconded and passed.

REPORT OF THE SUB-COMMITTEE ON COOPERATIVE WINTER NURSERIES

Director N. J. Volk presented a report on the activities of the NCT-40 Committee. This special committee met in Chicago in early fall to discuss the problem of cooperative winter nurseries. In general, the representatives representing Horticultural Crops as well as the small grain breeders were not interested in any single location. It was felt that their specific needs could be better satisfied by a variety of sites, each chosen because of its suitability for some specific crop.

No funds were allocated to this Committee and on the basis of the present situation it appears that the most that can be hoped for in the very near future might be sufficient funds to establish a coordinator having responsibilities in this general area. The coordinator would be supplied with travel funds and his responsibilities would be to locate suitable areas which might be used for:

1. Winter nurseries
2. Screening evaluation for insect and disease resistance and nematode reaction.
3. Initial increase of breeders seed.

Following this summary by Director Volk there was considerable discussion of the need for and usefulness of winter nurseries to the corn breeding programs of both the North-Central and Southern regions. Dr. Leng had made a survey of the areas in Florida now in use for winter nurseries by both private and public organizations. He stressed the fact that due to variation in soil type, elevation, etc., that wide differences in suitability could be expected within a limited distance. He stressed the need for the very careful evaluation and selection of possible sites.

AFTERNOON SESSION, MARCH 4

The afternoon session was devoted to discussion of a series of topics which had been suggested to the Chairman as being of general interest.

THE ROLE OF THE NORTH CENTRAL HYBRID CORN RESEARCH COMMITTEE

Dr. E. H. Rinke presented a brief report on the desirability of comparing the various methods, procedures and objectives of the programs within the North Central Region. This was followed by an extensive discussion. Following this discussion it was MOVED by Dr. Rinke that the Executive Committee be instructed to schedule a program at the next meeting on the topic "How I would breed corn." The motion was

Seconded by E. C. Rossman and passed.

SHOULD THE DEVELOPMENT OF HYBRIDS BE DE-EMPHASIZED BY STATE AND FEDERAL CORN BREEDERS?

It is not necessary for me to remind this group that important improvements and important adjustments to new situations, lie ahead in corn breeding and hybrid making.

The development of improved inbred lines, being fundamental to corn improvement, must continue as an Experiment Station activity of importance. The development of lines and the development of hybrids are closely related. For instance, an inbred line is perhaps not "developed" until a place in hybrid combination has been found for it.

We may fail to appreciate the importance of hybrid combinations which have been demonstrated as superior in Experiment Station tests. I mean here the importance of these hybrids in influencing the make-up of closed-pedigree hybrids. Possibly this situation is operative more by smaller producers, than by the very large producers, but it operates and will continue to operate. The published record of performance of a superior formula, may suggest several slight modifications to different people and some of these modifications may become much used closed formula hybrids.

Experiment Station agronomists are gradually turning more attention to problems related to breeding and hybrid making. Maybe these problems are more fundamental. At least their solutions often lead to more generally useful knowledge compared with the direct approach. Younger agronomists are being employed more than formerly on the basis of their training and capabilities in genetics, biometry and other basic fields.

This trend, of necessity, means some de-emphasis on hybrid making as such.

The difficult question is, "How much de-emphasis?" Each station will have to answer that question by weighing its own capabilities for contribution to the immediate and long term needs of its area. But it must not neglect its opportunity and responsibility for influencing the genetics of the corns that farmers will grow.

THE USE OF THE DIGITAL COMPUTER IN PREDICTING DOUBLE-CROSSES

The datatron digital computer at Purdue is a product of the Electrodata Division of Burroughs. "In speed of computer operation, the datatron is classed below the very large-scale electronic data processors--and considerably above card-programmed computers, other externally programmed computers, and the small, stored program computers. The computer operates at a rate of a little more than 100 additions, substractions, multiplications, or divisions per second.

The computer at Purdue is available to all, whether employed at Purdue or elsewhere. The rate for use of the computer is $65.00 per hour. There is also a fee for programming ($3.00/hr.) and for "debugging" new programs ($15.00/hr.); that is, to remove errors from the program. If there is a program presently in existence this "debugging" operation is not necessary. Such "debugged" programs now available are:

1. Regression and correlation routine.
2. Analysis of variance routine.
3. Factor analysis routine.
4. Solution of simultaneous linear algebraic equations and matrix inversions.
5. Characteristic roots and vectors of a symmetrical matrix.
6. Solution of linear first order systems of ordinary differential equations.
7. Roots of an Nth degree algebraic equation in one variable.
8. Linear programming routine to compute a solution for a system of linear inequalities.
9. A host of subroutines primarily for incorporation into programs. A few of the subroutines are $\sqrt{X}$, X !, sin x, probability function, interpolations, and integration.
10. The program for predicting double crosses from the four non-parental singles is now "debugged" and immediately available for future use.

The program for predicting doubles as now written is limited to an all combination group of 21 inbreds. To exceed this would eliminate the use of "high speed memory loops" in the datatron thereby increasing computer time and cost.

The datatron can operate on 10 digit "words"; in the present predicting scheme the first 3 digits are for yield, the second 3 for lodging, and the last four for moisture. However any other item can be predicted as long as the 3-3-4 word arrangement can be maintained. If more than 3 items are desired the program must be repeated. Inbred names are carried in the machine as a numerical code.

Because the datatron is more efficient as a calculator than as a sorter or ranker it was most efficient that these latter operations be performed on standard I.B.M. equipment. A criterion of 125 bu. per acre was given to the computer and all hybrids with a predicted yield below this figure were discarded automatically. This criterion can be varied and a criterion can also be placed on lodging and moisture.

Print out from the computer can be on anyone or any combination of punched cards, punched tape, magnetic tape, printed documents, or visual indications. In the present problem punched card out-put was used and four predicted double crosses with predicted yield, lodging, and moisture were obtained per punched card.

Subsequent operations on I.B.M. equipment ordered the predicted hybrids on yield, lodging within yield, and moisture within lodging.

The time to complete the prediction of double crosses from a group of 21 inbreds was one hour and twenty minutes. In this time almost 18,000 double crosses were predicted, although only 2,800 yielded 125 bu. or more and were therefore saved. Subsequent I.B.M. operations take about one day. I believe the total cost for this operation will be about $125-150.

SOME OBSERVATIONS ON THE NATURE OF DISEASE RESISTANCE IN CORN

In a study of the nature of resistance in corn to Helminthosporium leaf spot (incited by Helminthosporium carbonum Race I) it has been found that an extract prepared with ethanol from heavily inoculated resistant seedling leaves is completely inhibitory to germination and growth of parasite in vitro. Similarly prepared extracts from inoculated, susceptible host material is only slightly inhibitory. Extracts prepared from noninoculated resistant or susceptible host tissue, on the other hand, support good growth of the fungus. Assay for activity of extracts is made by combining the dry residue of the latter with potato-dextrose agar.

When the toxic extract from inoculated resistant host tissue is partitioned into ether and water fractions, both fractions support good growth. When the two fractions are combined, however, toxicity is again restored and is equivalent to that of the original crude extract.

Drying of the inoculated, resistant seedling leaves for more than 4 hours at 72°F. destroys the toxic material that appears to be formed in the resistant host cells in response to penetration by the parasite.

Thus far neither chromatographic nor spectrophotometric analysis have given any clue as to the nature of the toxic material in extracts prepared from inoculated resistant host tissue. The toxic material is stable to autoclaving and is active against a number of fungi other than H. carbonum.

This study is being conducted in cooperation with Dr. J. Kuć of the Biochemistry Department of Purdue University.

A. J. Ullstrup

THE EFFECTIVENESS OF PLANT RESISTANCE IN REDUCING CORN BORER DAMAGE

An experiment designed to determine the effectiveness of plant resistance in reducing damage caused by the European corn borer was concluded after three years of testing at Ankeny, Iowa. Two double crosses and eighteen single crosses of corn varying in their relative resistance to leaf feeding of the European corn borer were compared under three levels of first brood borer infestation. The three borer treatments were (1) sprayed with DDT, (2) natural borer infestation, and (3) natural infestation supplemented with three corn borer egg masses per plant added by hand. The difference in yield between the sprayed treatment and the treatment with the heaviest borer infestation was used as a measure of the borer damage.

A wide differential in borer survival was obtained between hybrids as well as between borer treatments. As an average over three years, borer damage caused a yield reduction of 15.7 bushels per acre in three

susceptible x susceptible single crosses, 10.1 bushels per acre in nine susceptible x resistant single crosses, and 6.1 bushels per acre in six resistant x resistant single crosses. When compared on a parent inbred line basis, WF9 crosses were most susceptible with a 17.0 bushels per acre loss in yield; and CI.31A crosses were most resistant with an average loss in yield of 4.5 bushels per acre. There was some evidence that Bl4 had considerable tolerance to borer feeding as the Bl4 crosses were not damaged as heavily as was expected on the basis of their high leaf feeding susceptibility. The development and use of hybrids having both leaf feeding resistance and tolerance promises to be an effective method of reducing damage caused by the European corn borer.

L. H. Penny and F.F. Dicke

Table 1. Three year summary of yields and European corn borer data obtained on 19 hybrids compared under three levels of European corn borer infestation at Ankeny, Iowa in 1955, 1956, and 1957.

Hybrid	Corn Borer: Leaf feeding rating	Corn Borer: Damage points Per plant (2)	Corn Borer: Damage points Per plant (3)	Yields in Bu./A (1)	Yields in Bu./A (2)	Yields in Bu./A (3)	Yields in Bu./A (1)-(3)
AES 801	7.8	2.8	5.6	89.5	77.6	74.0	15.5
Susceptible x susceptible single crosses							
WF9 x B14	8.5	3.9	6.5	89.5	78.9	73.4	16.1
WF9 x 38-11	7.6	3.4	5.4	83.8	71.1	64.4	19.4
B14 x 38-11	7.5	3.0	5.2	72.0	68.6	60.6	11.4
Mean	7.9	3.4	5.7	81.8	72.9	66.1	15.7
Susceptible x resistant single crosses							
WF9 x N16	7.7	2.9	6.3	103.4	85.6	73.0	30.4
WF9 x R71	6.2	2.6	4.6	90.7	78.9	76.0	14.7
WF9 x C.I.31A	3.5	1.7	1.8	99.3	95.0	94.7	4.6
B14 x N16	5.6	2.9	4.5	86.1	79.3	76.4	9.7
B14 x R71	5.7	2.1	3.6	90.0	83.4	84.9	5.1
B14 x C.I.31A	3.5	1.0	1.9	99.6	95.3	96.9	2.7
B14 x (WF9 x 458-1)Sel.	5.2	2.2	3.8	93.0	92.2	88.5	4.5
38-11 x N16	5.4	2.4	3.4	94.5	86.0	79.3	15.2
38-11 x C.I.31A	3.0	1.0	1.9	96.1	92.6	91.6	4.5
Mean	5.1	2.1	3.5	94.7	87.6	84.6	10.1
Resistant x resistant single crosses							
N16 x R71	3.9	2.2	2.9	95.6	86.1	83.4	12.2
N16 x C.I.31A	2.3	1.3	1.8	95.7	98.1	91.2	4.5
N16 x (WF9 x 458-1)Sel.	2.7	2.0	2.8	98.0	95.4	94.6	3.4
R71 x C.I.31A	2.4	0.9	1.4	90.8	89.3	86.8	4.0
R71 x (WF9 x 458-1)Sel.	2.6	1.6	2.5	93.4	87.4	86.9	6.5
C.I.31A x (WF9 x 458-1)Sel.	1.9	1.0	1.6	97.2	92.4	91.0	6.2
Mean	2.6	1.5	2.2	95.1	91.5	89.0	6.1

(1) Sprayed with DDT
(2) Natural borer infestation
(3) Natural infestation supplemented with additional eggs

Standard error of the difference between treatments within a hybrid for yield was 4.2 in 1955, 5.6 in 1956, and 6.4 in 1957.

THE NEED FOR MORE COOPERATIVE EFFORT IN BREEDING FOR EUROPEAN CORN BORER RESISTANCE AND TOLERANCE

The development and use of hybrids with greater resistance to European corn borer would save the nation millions of dollars worth of corn each year. Holes in the stalks from corn borers also provide access for spores of stalk rotting organisms. The resulting spread of stalk rot in susceptible hybrids causes heavy losses, ear droppage, lodging, and difficult mechanical harvesting of the crop. Thus, the use of corn hybrids with greater resistance and tolerance to European corn borers would lessen outlays for materials and equipment for control measures, improve yields and quality, and lower production and harvesting costs.

The first-brood larvae cause considerable leaf injury. Such feeding destroys the leaf surface, breaks midribs and tassels, and lowers grain yields. In general, the second brood results in decreased yields, ear droppage, lodged plants, more trouble in mechanical harvesting, and poorer grain quality. Brindley stated that "The results of the work to date have shown that the first brood is a greater problem in Minnesota and Iowa than is the second brood, while the reverse of this situation is true in Ohio."

Our Illinois corn borer program has been in cooperation with the U.S. Department of Agriculture European Corn Borer Research Laboratory, and the Illinois Natural History Survey. Mr. F. F. Dicke, Dr. W. D. Guthrie, and Dr. G. C. Decker, have been especially helpful.

In 1946 Dr. R. O. Snelling provided me with 270 open-pollinated ears from his "Corn borer Synthetic". I used this and other material in an experiment to make direct comparisons of single-hill versus ear-to-row methods of selection in developing inbred lines. Eggs from the USDA European Corn Borer Laboratories were used whenever a surplus was available. Single hills were very effective in these studies. They permitted us to work with a considerable range of material, and required a minimum of egg masses, labor and land.

Four new inbred lines R71, R109B, R113 and R168, were released to the general public in the spring of 1956. These inbred lines have about twice the resistance to the first brood of the European corn borer as widely-used inbred line WF9. These inbreds also have demonstrated superior combining ability for yield and other Agronomic characteristics. They combine especially well with WF9 x Hy2, WF9 x 38-11, and 38-11 x K201. A number of other new corn-borer resistant inbreds appear to be promising.

Ill. 3049 (Hy2 x WF9)(R71 x R109) involves two of the inbred lines used in Ill. 21 and U.S. 13. As shown below, substitution of corn-borer resistant inbreds, R71 and R109, resulted in 13 bushels greater yield and 20 percent better standability.

Hybrid	Acre yield bu.	Days to half silk no.	Moisture in grain pct.	Erect plants pct.
Ill. 3049	114	60	21	96
Ill. 21	101	60	20	80
U.S. 13	100	61	20	76

I believe that superior-performing hybrids can be developed by utilizing selected corn-borer resistant inbred lines from several workers. This calls for cooperative effort. It also requires a more adequate and stable supply of eggs of the corn borer. Exchange of ideas, breeding materials, inbred lines, and data should result in the development of higher-yielding hybrids with less ear droppage, better standability, and which could be grown at a lower cost of production.

R. W. Jugenheimer

REPORT OF THE PURDUE AMYLOSE CONFERENCE

A conference on the chemistry and breeding of high amylose corn was held at Purdue University on February 5. The first report, presented by G. F. Sprague, dealt with previous studies on the amylose; amylopectin ratio. It was suggested that some of the findings relative to the breeding and genetic studies and subsequent commercial utilization of waxy corn might have a bearing on similar problems which might be expected when and if high amylose corn reached the stage of commercial utilization. It was further suggested that since Industry has had little chance to study the properties of amylose, other than that produced by artificial separation, their estimates of the amylose percentage necessary for commercial utilization may be of limited value.

Dr. Paul Kaplan of Stein, Hall and Co., Inc., reported on the recent Dutch patent for the separation of amylose and amylopectin fractions from potato starch. Amylose produced in this manner is in commercial use in this country at the present time. Dr. Kaplan pointed out that while amylose might have a very definite place industrially in the area of films and fibers that unless some larger scale use was discovered the total amount of corn required to satisfy the probable film and fiber demand would be limited.

Dr. Ivan A. Wolff described his work, done at the Northern Utilization Research Branch, on the properties of amylose films. This work was suggestive and encouraging but much remains to be done with different plasticizers, etc., before the industrial possibilities can be considered to have been fully explored.

Dr. G. N. Richards of the British Rayon Institute reported on the properties of films and fibers produced from amylose acetate. Amylose acetate fibers compare favorably in some respects with rayon. However since rayon is rapidly losing out to other synthetic fibers there appears to be little hope in this area unless better and more versatile fibers can be prepared.

General presentations of the chemical and physical properties of amylose were presented by Mr. J. N. BeMiller and Dr. J. F. Foster, respectively, both of Purdue University.

Dr. S. A. Watson of the Corn Products Refining Co., reported on the wet milling properties of two samples of high amylose corn. These samples were found to be lower in starch and higher in protein than normal corn. Also the starch-gluten separation was rather poor. He stressed that these observations must be considered as preliminary because of the small number of samples tested. However the low starch yields, etc., should be given careful consideration in the development of any high amylose hybrids developed for commercial milling.

The amylose program in Missouri was discussed by Dr. E. H. Coe. This program consists in selection on a pedigree basis for amylose percentage, and a wide-spread search among exotic types for new genes or gene systems conditioning amylose percentage. The highest amylose percentage obtained so far in these studies has been 82. Of the gene systems currently known ae (amylose extender) apparently is greatly influenced by modifiers.

Dr. H. H. Kramer of the Purdue Station reported on specific gene effects in high amylose corn. Five genes are currently known to have some effect on amylose percentage. These are wx, su, su_2, du and ae. Combinations of some of these genes produce unexpected interaction effects. The highest amylose percentages so far obtained have come from combinations of du and ae plus an unknown number of modifier factors.

Mr. John T. Goodwin, Director of the Corn Industries Research Foundation spoke on the place of the wet corn milling industry in the development of high amylose corn. He stated that the Research Foundation was willing to give some financial support to the amylose program. Contacts had been made with the various institutions doing breeding and genetic work on the development of high amylose types but at the time of his talk no decision had been reached as to where their support could most effectively be used. The decision on this point was to be made by the Directors of the Corn Industries Research Foundation.

Director N. J. Volk of the Purdue Station stressed the need for continued cooperation and the desirability of coordination of future research. He emphasized that the Purdue Station would welcome serving as host to some subsequent conference, when developments warranted, or they would be equally willing to cooperate and participate in such a conference if some other cite were chosen.

G. F. Sprague

PROGRESS REPORT ON HIGH AMYLOSE CORN

Currently there are three major genes that are associated with increase in amylose content without materially decreasing starch production. These are ae (ha_1) on chromosome 5, su_2 on chromosome 6, and du_1 on chromosome 10. Amylose percentages for stocks of ae range from 45-61, su_2 from 38-40, and du_1 from 35-42 percent. However, there appears to be a wide range in amylose content when ae is combined in double recessive combinations with different sources of du_1 and su_2. For example, five different sources of du_1 when combined with ae, gave 37.6, 47.5, 60.2, 63.6, and 82.0 percent, respectively. These differences are attributed to the source of the du_1 stock used. Some du_1 stocks actually depress the amylose content, while others may increase it, in combinations with ae.

The question that remains partially unanswered at this time is whether these differences are due to the action of the du_1 gene itself or whether these sources of du are bringing in modifying factors. It is the current belief of some investigators that these differences are due to modifiers. To support this we have found the Missouri source of du_1 (ha_2) in the double recessive combination with ae to be segregating in the F_4 generation. Although the data for the F_5 generation are rather meager, it appears most cultures are now reaching a stability point.

Thus far we have not used the su_2 gene in our studies. However, the same picture seems true for this gene as for du_1. When different sources of su_2 stocks are placed in the double recessive combination with ae, other workers report a range from 55.3 to 74.0 percent.

For the triple recessive ae du_1 su_2, one worker reports 48 percent while another reports 66.8 and 70.2 percent amylose where the source of su_2 and ae are the same but the du_1 source varies.

One cannot determine the relative value of different sources of du_1 and su_2 by making amylose determinations on the homozygous single recessive stock. They must be tested in double recessive combinations with ae to establish their relative value and tested in advanced generations, preferably in the F_3 generation.

To complicate the picture further, when different inbred lines are converted to ae, a wide range in amylose is exhibited. Apparently this range in amylose is due to modifiers present in the inbred parents and these modifying genes are apparent only in the presence of ae. When transferring the Missouri source of the du_1 (ha_2) gene to the same series of inbreds, no such range was apparent.

To sum up this phase it is evident the breeding of high amylose hybrids will be a long drawn out procedure, necessitating many amylose determinations. Phenotypically, normal can be separated from high amylose kernels but kernels ranging from 40 percent to 80 percent amylose cannot be differentiated. Thus, a faster method is needed, preferably on a single kernel basis where the kernel could be salvaged to reproduce seed. Especially will this be so if it is necessary to have combinations of three and four recessive genes plus the various modifiers to reach a higher amylose content than 80 percent. The single kernel analysis method would also facilitate the use of the recurrent selection technique.

Another solution would be to find a single gene that would cause 100 percent amylose or all straight chain molecules in the same manner that wx gives 100 percent amylopectin or all branched chain molecules.

In the meantime it will be necessary to continue the search for genes that give abnormal type endosperms. The more corn breeders keep on the alert for these abnormal types the more progress that will be made. After these are located, they should be checked for amylose content and then tested against ae, su_2, and du_1 stocks for allelism. If any new genes are found to have a higher than normal amylose content and are non-allelic to these 3 major genes, they will be of extreme interest. If they are allelic, they should be combined with ae and advanced to the F_3 generation and determinations made on at least 40 ears to determine whether the new source offers any promise in increasing amylose content.

When corn breeders find any unusual endosperm types, if they will send these either to Dr. Herbert H. Kramer, Department of Agronomy, Purdue University, Lafayette, Indiana, or to our office at 109 Curtis Hall, University of Missouri, Columbia, Missouri, it will be greatly appreciated.

M. S. Zuber and C. O. Grogan

CURRENT STATUS OF DWARF CORN RESEARCH

During 1957, dwarf double-cross hybrids of the brachytic-2 type were tested at 16 locations in Illinois and three locations in Kansas. In addition, tests were conducted in Illinois and Kentucky on planting rates with dwarf and normal hybrids, and in Illinois on performance of dwarf single crosses, and planting rate and row spacings with a dwarf hybrid composite. A comparison of harvestability, between dwarf and normal hybrids was also conducted in cooperation with the Department of Agricultural Engineering at Illinois.

In general, observations from the tests in 1957 confirmed earlier findings that the dwarf hybrids have outstanding resistance to lodging, but are somewhat lower than comparable normal hybrids in yield. As an average of the comparisons made between "Dwarf U.S. 13" and the normal hybrid, the dwarf version yielded approximately 9 percent less than the normal hybrid, but showed virtually no lodging, while the normal U.S. 13 averaged only 50 percent plants erect at harvest.

Preliminary studies indicate that partial barenness of a certain percentage of ears is one of the major factors involved where lower yields are observed in dwarf hybrids. Further studies of this situation are planned for 1958.

A wide range of performance, especially with regard to yield, has been found in the different dwarf hybrids studied. Four of the highest-yielding dwarf hybrids thus far tested have been selected for seed production in 1958, these hybrids are closely related, all being approximately of U.S.13 maturity. Approximately 45 acres of double-cross seed production are planned for 1958. Sufficient seed should be produced to allow fairly extensive field-scale tests of these hybrids in 1959.

Planting-rate and row-spacing studies with dwarf hybrids have so far been somewhat inconclusive. Results to date, however, indicate that dwarf hybrids are not able to tolerate higher population rates (above 20,000 plants per acre) better than comparable normal hybrids. In fact, the evidence suggests that dwarf hybrids of the brachytic-2 type actually may be somewhat less tolerant of high rates than normal hybrids. Decreasing row width to 30" or 20" produced slight increases in yield in one experiment, but in another test, resulted in no increase or an actual decrease, as compared with 40" row spacings.

Harvestability studies conducted in 1957 could be considered little more than "pilot plant" investigations, and the results are being used primarily to plan improved experiments in 1958. The dwarf composite studied did not differ significantly from normal U.S. 13 in ear or shelled corn losses, where four types of harvesting equipment were used, with the exception that the dwarfs showed significantly less ear loss than the normal hybrid in plots harvested with the Oliver "corn header." The latter machine is a cutter-bar type, in which substantially the whole plant is taken into and through the machine.

Studies of hybrids currently available are being expanded in 1958, and seed is available for tests by investigators in other states. Development of a much wider range of dwarf inbred lines and hybrids is underway, both by conversion of existing normal lines, and by inbreeding and selection within segregating material homozygous for the brachytic-2 gene. Fundamental studies with this material, and investigation of other dwarfing factors, also are in progress.

E. R. Leng

Table 2. Comparison of Normal and Dwarf (brachytic-2) versions of hybrid U. S. 13. Seven locations in Illinois, 1957.

Location	Yield, bu. per acre		Erect plants o/o	
	Normal	Dwarf	Normal	Dwarf
Urbana	131	111	48	100
Morris	128	101	86	100
Illiopolis	115	115	89	100
Peoria	115	100	42	96
Ashkum	102	87	55	100
Bowen	100	93	88	100
Bluffs	73	88	0*	60*
Means	109	99	50	94

* - Damaged by heavy windstorm in August

Table 3. Illinois Hybrid-Location Interaction Tests, 1957.
Expt. 901-914, Dwarf double-cross
Summary: Bluffs, Ashkum, Atlanta, Morris, Arcola, Illiopolis, Peoria, Urbana, Bowen, Brownstown and Wolf Lake.

Hybrid	Rank	Yield	Moisture	Shelling	Erect	Stand
	in yield	bu/a	perct.	perct.	perct.	perct.
7-9237	2	90.1	21.8	79	98	91
7-9827	5	86.1	22.4	80	97	86
7-9276	4	87.9	23.1	79	99	91
7-9271	3	89.1	23.1	78	99	89
7-9231	6	80.3	22.7	77	100	89
7-9326	7	77.9	23.2	77	100	89
7-9321	9	77.5	23.0	76	100	90
7-9371	1	90.3	22.5	78	98	88
7-9563	14	64.8	22.1	78	99	91
7-9526	15	59.6	22.1	77	100	87
7-9532	11	75.6	21.5	77	100	87
7-9832	12	68.0	21.6	77	99	86
7-9863	13	67.6	22.4	78	100	90
7-9268	8	77.9	21.6	79	100	87
7-9632	10	77.3	22.6	77	99	88
Average of all entries		78.0	22.4	78	99	89

Table 4. Dwarf corn - row spacing x population test. Urbana and DeKalb. Illinois, 1957.

Data from test conducted by J. W. Pendleton

Row spacings ins.	Yields, bushels per acre — Plant population 12,000	16,000	20,000	Means
	(Urbana (Planted June 1, harvested Nov. 18)			
20	107.7	115.9	119.6	114.4
30	106.5	115.1	133.5	118.4
40	104.1	125.2	127.9	119.1
Means	106.1	118.7	127.0	
	* * * * * * * * * * * * * * * * * *			
	DeKalb (Planted May 6, harvested Nov. 1)			
20	90.5	101.8	91.4	94.5
30	87.3	90.8	88.4	88.8
40	81.1	86.8	88.7	85.5
Means	86.3	93.1	89.5	

The above data have not yet been subjected to analysis of variance

Table 5. Dwarf-normal harvestability comparison, Urbana, 1957. Losses expressed as bushels per acre.

	U.S.13 (normal) Ears	Shelled	Total	Dwarf Composite Ears	Shelled	Total
Oliver 1-row picker	4.0	2.9	6.9	8.1	4.7	12.8
Ford 2-row picker (vertically-aligned rolls)	5.9	3.8	9.7	5.1	6.1	11.2
John Deere combine (Picker head)	5.7	4.9	9.6	3.1	6.0	9.1
Oliver "corn header" (Cutter bar)	4.7	4.9	9.6	1.4	2.2	3.6
General mean			9.2			9.2

None of differences between dwarf composite and normal U.S. 13 in above comparisons were significant at the 5 percent level, except for ears lost by the Oliver "header", where losses in the dwarf were significantly lower than those in the normal

HYBRID x LOCATIONS AND HYBRID x YEARS INTERACTIONS

Studies of hybrid x locations, hybrid x years, and hybrid x years x locations, begun in 1955, were continued and expanded in 1957. Seven "sets", each of 25 open-pedigree hybrids, were grown. A total of 74 locations were planned; 64 were actually harvested. Station workers at Minnesota, Michigan, Missouri, and Kentucky collaborated in the 1957 testing program, as did several research workers with commercial seed companies in Illinois and Indiana.

All tests were conducted as 5 x 5 lattice squares, with 3 replications. Three of the hybrid sets studied consisted primarily of experimental hybrids and were tested for the first time in 1957. The other four sets each contain many standard hybrids. Two of these, the "early" and "midseason" sets, were tested in 1956 and 1957; the "midearly" and "late" sets were grown in 1955, 1956 and 1957.

Computer programming for calculation of the various interactions has not been completed; therefore, no detailed data are yet available. Preliminary studies, particularly with the "late" set, have indicated the existence of significant hybrid x locations and hybrid x years interactions in a number of comparisons. Attempts to relate these interactions to soil type, general geographic location, or yield level have largely been unsuccessful.

These studies are planned to be conducted in 1958 on approximately the same scale as in 1957. Particular emphasis will be put on the "early" and "late" sets. It is hoped that computer programming will be completed during 1958, thus enabling detailed analysis of the data to be undertaken.

Earl R. Leng

Table 6. Hybrid x location interaction tests, Illinois, 1956 - Ranks

The figures below represent ranking (among 25 hybrids) of selected hybrids at 6 locations

Hybrid	Location -	Brownstown	DuQuoin	Carbondale	Jonesboro	Wolf Lake	Mt. Carmel
	Soil type -	Cisne	Cisne	Stoy	Bonnie	Riley	Patton
"Early group"							
U.S.13		12	4	20	10	20	17
AES 805		6	2	25	8	7	7
Ill. 21		16	25	23	9	15	14
Ill. 972 A-1		10	6	15	21	16	19
Ill. 1511		8	8	21	13	6	11
Ill. 1868		1	23	8	7	23	6
Ill. 1915		23	11	12	18	12	3
"Average rank"		(11)	(11)	(18)	(12)	(14)	(11)
"Late group"							
Ill. 1349		2	21	1	5	3	10
Ill. 1539A		7	5	9	6	24	24
Ill. 1771		13	9	5	1	10	15
Ill. 1849		3	12	24	16	11	21
Ill. 1851		19	1	3	4	5	16
Ill. 1893		20	7	6	3	1	1
Ill. 2214W		5	18	2	2	2	12
"Average rank"		(10)	(9)	(7)	(5)	(8)	(14)

Above data based on 3 replications, 2 x 5 hills at each location, 12000 plants per acre

MEASUREMENT OF STALK STRENGTH

In 1956 three inbreds susceptible and 3 inbreds resistant to stalk lodging, the 15 possible F_1 crosses, 30 first generation, and 30 second generation backcrosses among these 6 parents were grown. The 75 crosses together with the 6 parents were planted in 3 replications of 2 x 5 hill plots. At maturity stalk loding counts were made and one plant from each hill of each replication was taken. This made a total of 30 plants for each entry. The mature plants were air dried. From each plant, the 2nd and 3rd internodes were removed. The 2nd internode was used for breaking strength and a 2 inch section from the 3rd internode was removed by sawing with a circular saw and this 2 inch section was used for determining crushing strength. Before the breaking and crushing strength determinations were made, the diameter of each internode, the length of the 2nd internode, and the thickness of rind for the 2 inch section sawed from the 3rd internode were measured. Based on the 1956 results two inbreds susceptible and 2 inbreds resistant to stalk lodging with their F_1 crosses, first and second generation backcrosses were grown in 1957. The study was confined to measuring the thickness of the rind, weight, and crushing strength of the 2nd internode.

Results

The results reported here are of a preliminary nature since time to fully evaluate all of the data has been limited.

All possible correlation coefficients of the 1956 data were computed between stalk lodging, plant height, number of European corn borer larvae per stalk, number of European corn borer tunnels per stalk, length of 2nd internode, breaking strength of the 2nd internode, diameter of the 3rd internode, thickness of rind for 3rd internode, and crushing strength of the 2 inch section of the 3rd internode. All possible correlations were made among the 1957 determinations.

Stalk lodging appears to be definitely associated negatively with breaking strength, thickness of rind, crushing strength, and weight of a 2 inch section of the 2nd internode. Rind thickness and crushing strength show the most promise as selective tools for stalk lodging resistance.

With few exceptions, the backcross progenies showed that increased gene dosages of the resistant or susceptible parent gave either a decrease or increase in stalk lodging with a corresponding increase or decrease in crushing strength.

Plant populations appear to directly affect lodging, rind thickness, and crushing strength.

Conclusions

1. Highly significant negative correlations were found between stalk lodging and breaking strength, thickness of rind, crushing strength and weight of a 2 inch section of the 2nd internode.

2. These results indicate the possibility of using either the thickness of rind or crushing strength method as best for selecting stalk lodging resistance and susceptibility.

3. From an economical and practical standpoint, the use of the rind thickness method appears tobe the best.

C. O. Grogan and M. S. Zuber

NEED FOR COOPERATIVE EFFORT IN BREEDING FOR OIL AND PROTEIN CONTENT OF CORN

Corn is an extremely versatile crop. Consequently, breeders may select types for particular uses. They may work with dent, sweet, pop, flint, floury, or waxy corn. These types, however, may be modified greatly by breeding and selection.

The University of Illinois gave the first evidence that oil and protein content in corn could be greatly increased or lowered by breeding. After 50 generations of selection, the mean oil content of Illinois High Oil was 15.36 percent compared to 1.01 percent for Illinois Low Oil; the mean protein content of Illinois High Protein was 19.54 percent, and 4.91 percent for Illinois Low Protein. Unfortunately these strains yield only about 50 percent as much as adapted hybrids. Fortunately, however, these traits may be transferred to standard inbred lines by breeding procedures.

Corn oil is a valuable by-product of the starch industry, and is high in energy value for livestock feeding. Most of the oil is in the germ of the kernel. Germ protein contains tryptophane and lysine, is biologically balanced, and is probably more valuable for livestock feeding than endosperm protein. High-oil hybrids having a high proportion of germ to endosperm, therefore, should benefit both the starch industry and livestock feeders.

Corn oil appears to absorb cholesterol in the blood. Consequently, the medical profession is interested in more corn oil. The nutritional properties of refined corn oil make it a valuable food. It is easily digested and contains some of the rare oily compounds now classified, like the vitamins, among the protective foods. Corn oil may be utilized by humans in bakery products, cooking oil, oleomargarine, mayonnaise, salad dressing, pharmaceuticals, shortening, and soups. Refined corn oil also has many non-food uses. Examples of these are ammunition, chemicals, paint, varnish, rubber substitutes, rust preventive, soap, soluble oil, and textiles.

Protein is an expensive but necessary constituent of food and feed. Quality of protein is fully as important as quantity of protein. The corn kernel contains two main types of protein. That found in the endosperm is primarily zein. Zein is deficient in tryptophane and lysine, which are essential for animal nutrition. The other type of protein, found in both endosperm and germ, contains both tryptophane and lysine and is biologically balanced. The corn breeder would like to increase the percentage of these amino acids in the endosperm protein. The alternative is to add them to the diet from other sources.

Zein is obtained from the gluten in the corn wet-milling process. The Northern Utilization Research Branch of the U. S. Department of Agriculture, Peoria, Illinois, studied dispersion of zein in strong alkali, "spinning" it into a fiber, and stretching and curing to give the fiber added strength. This fiber, which is available on the market under the trade name "Vicara," is used mostly in blends with wool for such garments as socks, swimming suits, and sweaters. Possible increased use of zein for special fabrics has created some interest in breeding corn for higher zein content.

High oil or high protein content was transferred at our station to standard inbred lines by backcrossing, selection and self-fertilization. Selection for high oil was accomplished by selecting ears bearing kernels with large germs. Oil content of the new inbreds ranged from 4 to 10 percent compared to 2 to 5 percent for the originals. Selection for high protein included selecting ears with hard, flinty kernels. Protein content of the backcrossed lines ranged from 11 to 22 percent compared with 11 to 14 percent for the original inbreds. In general, the backcrosses to high oil or high protein strains resulted in higher composition, but lower grain yields than backcrosses made to the original inbreds.

Breeding programs have been inaugurated by several Corn Belt agricultural experiment stations and private hybrid seed corn companies to develop hybrids with high oil or high protein content. Very little is known about the success of these efforts. Several of our Illinois experimental double cross hybrids involving recovered inbred lines have averaged considerably higher in oil and protein content, and were similar to standard hybrids in grain yield, standability, and other agronomic traits. Some of these hybrids, however, lack somewhat in standability. This trait, however, can be improved by breeding procedures.

The Illinois High Oil and High Protein strains have been widely used by corn breeders to provide sources of these traits. Consequently, we need more diverse sources of high oil and high protein content. I believe that greater genetic diversity of germplasm, and more cooperative effort is vitally needed in our programs of breeding corn with special chemical composition.

R. W. Jugenheimer

MORNING SESSION, MARCH 5

This session of the program was devoted to a consideration of the data from the uniform tests of AES hybrids and candidates from six maturity groups. The data from these tests were summarized by committee chairmen and the summarized results were discussed in connection with the assignment of new AES designations.

REPORT OF THE SUB-COMMITTEE ON UNIFORM TESTS IN THE 900 MATURITY SERIES

Mr. Wm. R. Findley, Jr., reported on the uniform tests of the 900 maturity group. The summarized results for the 1957 tests are presented in table 7 and for the 1956 and 1957 results in table 8. The Illinois hybrids, Ill. 1851 and 1893, were eligible for AES designations. However no State other than Illinois was interested in this material and no AES numbers were assigned.

Two sets of three-way combinations were compared in 1957. The data obtained are summarized in tables 9 and 10.

Table 7. Summarized performance of A.E.S. hybrids and candidates. 900 maturity series. 1957

Hybrid Designation	Pedigrees	1/ Acre Yield Bu.	1/ Moisture Pct.	2/ Stand Pct.	3/ LODGING Root Pct.	4/ LODGING Stalk Pct.	5/ Days to ½ Silk	6/ Dropped Ears Pct.	7/ Ear Height Grade	8/ Shelling Pct.	9/ Disease
Ill. 1849	(C103x38-11)(K201xCI.21E)	76.7	22.1	96	1	5	70	1.9	3.6	71	2.0
Ill. 1851	(C103x38-11)(Oh7xCI.21E)	85.2	20.2	94	6	10	70	1.7	3.7	76	2.0
Ill. 1893	(C103x38-11)(Oh7BxOh29)	81.6	19.4	94	6	6	69	.4	3.2	77	2.0
Ill. 2246W	(R144xR145)(R148xR149)	65.7	18.4	92	2	9	67	3.4	2.9	77	4.5
Ind. 6615	(H49xH55)(H53xB14)	82.5	21.6	91	4	6	68	2.9	3.1	73	2.0
Ind. 6874	(H49xH52)(H59xH60)	96.4	19.8	93	4	10	70	4.7	3.6	78	1.5
K2472W	(K55xK697)(K41xH30)	81.1	23.2	96	6	8	69	1.1	2.6	70	2.5
Mo. 800-3	(K201rxT202)(Mo.9284xCI.21E)	84.8	22.8	95	6	16	71	1.8	3.8	73	2.0
Mo. 916	(Mo.9108xCI.21E)(Oh7BxOh29)	88.0	22.4	92	5	7	71	.8	3.4	75	1.0
Mo. 958	(B41xOh7A)(Mo.3xCI.21E)	85.3	22.7	94	9	14	70	3.7	3.7	73	3.5
US 619W	(CI.64xK55)(Ky27xKy49)	85.9	22.4	94	9	14	69	2.0	3.0	78	1.5
Mo. 804	(CI.xK4)(38-11xCI.21E)	80.0	21.8	94	8	12	70	.9	3.6	77	3.0
AES 903W	(K55xH28)(K41xH30)	86.3	22.1	96	7	10	68	.5	3.0	72	3.0
AES 904W	(K64xMo.22)(T111xT115)	88.5	23.7	92	4	8	71	1.2	3.6	77	2.0
US 523W	(K55xK64)(Ky27xK49)	88.2	22.3	92	9	16	70	1.3	3.0	72	2.0
Mean		83.7	21.7	94	6	10	70	1.9	3.3	75	2.3

1/ Kas.; Mo.; Ohio; Wolflake & Brownstown, Ill.; Ind.; Hopkinsville & Lexington, Ky.
2/ Kas.; Mo.; Wolflake & Brownstown, Ill.; and Hopkinsville & Lexington, Ky.
3/ Kas.; Mo.; Ind.; and Hopkinsville & Lexington, Ky.
4/ Kas.; Mo.; Ohio; Brownstown, Ill.; Ind.; and Hopkinsville & Lexington, Ky.
5/ Kas.; Mo.; and Ohio
6/ Kas.; Mo.; and Hopkinsville and Lexington, Ky.
7/ Kas.; Brownstown, Ill.; Ind.; and Hopkinsville, Ky.
8/ Wolflake & Brownstown, Ill.
9/ Hopkinsville, Ky.

Table 8. Summarized performance of AES hybrids and candidates -900 maturity series
Average 1956 and 1957

Hybrid Designation	Acre Yield Bu.	Moisture Pct.	Stand Pct.	LODGING Root Pct.	LODGING Stalk Pct.	Days to ½ Silk	Dropped Ears Pct.	Ear Height Grade	1/ H.turcicum Score	1/ H.Maydis Score	1/ Corn Borer Inf.Pl. Pct.	1/ Smutted Plants Pct.	Shelling Pct.
*Ill. 1851	83.5	18.9	96	3	8	71	1.7	3.7	3.0	0.5	25.2	1	79
*Ill. 1893	81.0	17.9	95	3	5	69	1.3	3.5	3.0	2.5	15.7	1	78
Mo. 916	77.0	20.8	91	3	7	71	.9	3.5	3.5	2.5	16.9	5	76
Mo. 804	75.1	19.4	93	4	13	71	2.7	3.7	3.0	1.5	16.0	2	79
AES 903W	82.8	17.7	97	4	11	68	1.7	3.3	3.0	3.0	22.2	1	75
AES 904W	82.3	21.0	93	3	8	72	2.0	3.7	3.0	0.0	41.8	5	80
U.S. 523W	82.1	19.9	94	5	13	70	2.9	3.3	3.0	0.0	36.8	2	76
Mean	80.5	19.7	94	4	9	70	1.9	3.5	3.1	1.4	24.9	2.4	78

Pedigrees

Ill. 1851	(C1C3x3E-11)(Oh07xCI.21E)
Ill. 1893	(C1O3x3E-11)(Oh7BxOh29)
Mo. 916	(Mo.910ExCI.21E)(Oh7BxOh29)
Mo. 804	(CI.7xK4)(38-11xCI.21E)
AES 903W	(K41xH30)(K55xH28)
AES 904W	(K64xMo.22)(T111xT115)
U.S. 523W	(K55xK64)(Ky27xKy49)

1/ Results for 1956 only

* Eligible for AES designations - no interest

Table 9. Summarized performance of uniform tests of Mo.804 topcrosses, 900 maturity series. 1957

Pedigree	1/ Acre Yield Bu.	2/ Stand Pct.	1/ Moisture Pct.	3/ LODGING Root Pct.	1/ LODGING Stalk Pct.	4/ Dropped Ears Pct.	5/ Ear Height Grade	6/ Days to ½ Silk No.	Corn 7/ Borer Rating (1-9)	Aphid 8/ Infested Plants Pct.	Hand 8/ Harvested Ears 100 Plants	9/ Disease
o.804 x R113	74.2	95	17.9	8	8	1.3	3.1	70	5.0	2.6	85.7	2.5
" x R153	69.6	95	20.9	13	6	3.3	3.6	73	7.3	5.3	97.4	2.5
" x R154	80.2	86	17.1	14	18	0.6	3.1	70	7.3	4.8	105.7	4.0
" x R159	81.1	93	18.5	4	8	1.6	3.1	72	5.3	3.3	87.9	3.5
" x R166	85.6	94	17.5	7	10	1.2	2.9	70	7.0	12.7	99.2	3.3
" x R173	71.0	94	16.7	10	7	2.4	2.8	69	6.3	0.0	94.0	3.5
" x Kan. 49-55	79.4	92	21.1	9	10	2.1	3.8	72	5.7	5.4	82.7	2.0
" x Kan. 54-55	78.3	91	20.4	12	17	1.6	3.2	71	6.3	2.5	117.5	2.5
" x Kan. 76-55	88.3	94	23.1	22	8	3.1	3.4	73	6.3	4.3	85.3	2.5
" x Kan. 86-55	83.0	94	19.0	13	20	0.6	3.6	69	6.0	3.1	109.4	2.0
" x Ka... 132-53	86.0	93	19.4	17	17	3.2	3.4	70	6.7	10.7	95.9	4.5
" x Kan. 159-53	77.0	96	19.6	12	9	1.0	3.7	72	7.3	2.7	84.7	3.0
" x Mo.9103	94.8	96	22.8	7	5	2.1	3.8	75	4.3	15.6	89.9	1.0
" x Mo.9294	83.3	96	21.7	7	6	0.0	3.8	78	5.3	2.4	91.1	2.5
" x Mo.01392	85.7	94	23.4	11	6	1.5	3.4	73	3.0	1.7	78.6	2.0
" x Mo.01480	84.3	95	20.0	12	22	1.5	3.4	72	4.0	8.7	93.9	3.5
" x Mo.1979	77.3	94	21.2	7	15	0.9	3.7	74	7.3	8.6	75.0	3.0
" x Mo.11077	81.7	97	20.6	12	5	0.8	3.0	72	7.3	18.5	91.7	2.5
" x Mo.11144	81.7	95	20.3	5	10	0.6	3.3	74	5.3	3.2	94.4	1.5
" x Mo.11153	82.6	93	20.0	10	5	2.4	3.6	75	5.3	6.8	91.5	1.5
" x Mo.11276	78.7	97	18.9	4	6	3.7	3.0	73	6.0	3.1	86.3	2.0
" x NC218	86.2	92	22.0	6	8	1.1	4.0	76	6.0	9.7	92.9	1.0
" x NC220	84.4	93	22.5	7	10	1.5	3.7	76	5.7	8.7	101.9	2.5
" x NC222	78.4	93	24.9	15	7	1.3	3.3	77	5.7	2.8	85.2	2.5
" x NC224	78.4	94	22.0	6	5	1.8	3.5	76	5.7	0.0	90.8	2.5
" x Oh8	80.5	93	22.3	12	5	1.7	3.3	75	5.0	2.5	81.6	1.0
x CI.90A	86.5	97	19.3	9	7	3.1	4.1	77	8.0	6.6	96.7	2.0
x CI.91B	81.0	96	20.6	10	8	3.0	3.7	71	3.3	3.6	91.9	1.5
Mean	81.4	94	20.5	10	10	1.8	3.4	73	5.8	5.7	92	2.4

1/ Ill.; Ind.; Kan.; Hopkinsville & Lexington, Ky.; Mo.; Ohio
2/ Ill.; Ind.; Kan.; Hopkinsville & Lexington, Ky.; Mo.
3/ Ind.; Kan.; Hopkinsville & Lexington, Ky.; Mo.
4/ Kan., Mo.
5/ Ill.; Ind.; Kan.; Hopkinsville & Lexington, Ky.
6/ Ind.; Kan.; Ohio.
7/ Iowa
8/ Ohio
9/ Hopkinsville, Ky.

Table 10. Summarized performance of uniform tests of AES903W topcrosses, 900 maturity series. 1957.

Pedigree	1/ Acre Yield Bu.	2/ Acre Yield Bu.	2/ Stand Pct.	2/ Moisture Pct.	2/ LODGING Root Pct.	2/ LODGING Stalk Pct.	1/ Dropped Ears Pct.	3/ Ear Height Grade	4/ Days to ½ Silk Days	Corn 5/ Borer Rating (1-9)	6/ Disease
AES903W x 33-16	79.7	82.2	97	19.8	6	5	.7	3.3	62	6.3	2.5
" x K699	68.4	71.2	96	20.0	3	8	.6	2.7	61	5.7	1.5
" x K723	68.4	71.5	93	18.2	5	10	.4	2.7	61	8.0	2.0
" x K733	66.8	71.1	96	20.2	10	16	1.1	2.7	62	8.3	2.5
" x K735	74.2	76.8	94	19.5	4	7	.7	2.7	62	6.0	2.0
" x K745	71.8	74.0	97	18.0	9	13	.6	3.1	62	7.3	3.0
" x K3-580	70.3	75.2	95	19.2	7	9	1.2	3.0	62	7.7	4.0
" x K3-735	66.8	68.8	95	17.8	12	7	.5	2.9	61	5.7	3.0
" x K5-463	71.1	74.2	97	19.6	8	5	1.3	3.4	63	8.3	4.0
" x K5-468	64.1	68.7	96	26.6	4	7	.7	2.9	65	6.3	2.0
" x K5-470	67.6	72.0	91	19.7	11	5	.6	3.1	65	5.0	3.0
" x K5-474	67.6	71.2	96	21.0	4	4	.4	3.1	67	5.7	1.5
" x K5-509	71.9	76.9	97	21.1	4	5	.4	2.7	65	6.0	3.0
" x K5-514	60.8	64.8	97	22.9	5	6	.6	3.0	65	5.7	2.0
" x K5-515	69.5	74.4	98	21.6	9	5	.3	2.9	65	6.0	2.5
" x K5-516	72.5	75.6	94	19.3	6	9	.9	2.8	62	5.0	2.5
" x K5-540	67.7	71.9	96	18.6	13	7	.5	2.9	61	6.7	3.5
" x K5-591	66.2	69.4	96	22.4	3	3	1.1	3.1	62	5.7	2.0
" x K5-596	63.5	71.4	96	23.4	7	5	1.1	3.4	64	5.7	2.0
" x K5-668	76.3	78.8	96	23.8	8	8	.6	3.6	66	5.0	2.0
" x K5-673	57.8	63.1	98	19.8	7	11	1.1	3.6	65	6.0	2.5
" x K5-754	61.0	64.5	96	18.6	6	11	.2	2.5	61	7.0	3.5
" x Ky201	79.1	82.2	94	18.4	4	5	.9	3.0	63	6.0	3.0
" x Mo.11474W	67.0	73.6	94	19.4	6	6	.6	3.0	64	6.3	3.0
" x Mo.11903W	72.8		92	22.8	5	5	.4	3.6	64	6.7	1.5
" x Mo.12001W	67.1	69.5	87	20.1	5	3	1.2	3.3	65	5.3	1.5
" x Mo.12041W	72.3	74.9	92	23.0	5	6	1.3	3.2	63	5.7	3.5
" x Mo.2782W	64.0	66.5	91	19.8	7	9	1.3	3.0	66	8.0	3.0
" x Oh3W	61.8	66.2	92	22.7	3	6	.7	3.2	68	8.3	3.0
" x CI. 49A	73.3	76.1	95	21.0	4	6	1.5	3.3	64	8.3	3.0
" x Eg205	60.5	67.4	94	19.7	5	19	.8	3.1	63	6.7	2.5
AES903W	73.9	77.7	97	20.6	6	9	.4	2.9	62	6.3	3.0
Mean	68.6	72.3	95	20.6	6	8	.8	3.1	63	6.5	2.6

1/ Kan.; Hopkinsville & Lexington, Ky.; Mo.
2/ Kan.; Hopkinsville & Lexington, Ky.; Mo.; Va.
3/ Kan.; Hopkinsville & Lexington, Ky.; Va.
4/ Kan.
5/ Iowa
6/ Hopkinsville, Ky.

Seed of yellow three-way combinations involving the tester parent B41 x Oh7A was made by the Missouri and Oklahoma Agricultural Experiment Stations. White three-way combinations with K55 x CI.64 were made by the Kansas and Kentucky Agricultural Experiment Stations. The following crosses are available for 1958 uniform tests:

B41 x Oh7A	K55 x CI.64
38-11	33-16
Oh41	H30
CI.21E	Ky27
CI.38B	CI.49B
CI.21E x CI.42A	K730
R90	K755
R190	K784
R191	K5-453
K708	K5-474
K720	K5-509
K763	K5-512
K5-50	K5-515
K6-49	K5-516
Ky55-549	K5-525
Ky55-562	K5-557
Ky56-433	Ky201
Mo.Syn	Ky209
Mo.3952	Ky211
Mo.3957	Ky213
Mo.9681	Ky56-126
Mo.53686	Ky56-150
Va6-52	Ky56-180
Va6-58	Ky55-190
Va6-71	Mo.HP105
Va6-79	
Va6-112	U.S.523W
Va6-118	
Va6-136	
Va6-224	

States interested in testing the 900 series three-way crosses and the amounts of seed requested by each are as follows:

Yellow group		White group	
Illinois	250 seeds	Kansas	400 seeds
Kansas	300 seeds	Kentucky	400 seeds
Kentucky	320 seeds	Missouri	800 seeds
Missouri	400 seeds	Iowa (corn borer)	50 seeds
Oklahoma	200 seeds		
Virginia	240 seeds		
Iowa (corn borer)	50 seeds		

Three-way combinations involving B41 x Oh7A as tester parent for the yellow lines and K55 x CI.64 for the white lines will be made in 1958 for 1959 uniform tests. Missouri and Virginia will make seed of the yellow crosses and Kansas and Kentucky seed of the white three-way combinations. Cooperators entering lines in the respective tests should supply seed as follows:

Yellow lines		White lines	
Missouri	50 seeds	Kentucky	50 seeds
Virginia	50 seeds	Kansas	50 seeds

Lines nominated for three-way crosses are listed below under the corresponding tester parent:

B41 x Oh7A

Line	Origin
38-11	
Oh41	
CI.21E	
CI.38B	
CI.21E x CI.42A	
R132	(R30 x H10)H10BC^3(Y) S 7-144
R134	(Mo2RF x K201)K201BC^3(Y) S 7-146
R197	R80 x K201 S5 7-221
R198	R78 x K201 S5 7-218
K7-25	Hendricks Midland O.P.
K7-27	Open Pollinated
K7-47	(38-11 x K10)38-11[2/]
K7-50	(K64 x 38-11)K64
Ky127	Ky36-11 x K4[2/]
Ky57-565	Midland 3-1-1-2-1-1-2
Ky57-582	NC7 x CI.7
Ky57-619	Ky112 x Ky36-11
Ky57-636	Ky112 x M36-893
Ky57-649	M14 x Ky36-11
L39	Local O.P.39
Mo5	(K55 x N6) x K55[2/]
Mo0225	M/T8

Line	Origin
Mo999	M/T8
Mo9108	M/T8
Mo9294	Mo940 x Kys
Mo11077	Miss Hyd x M14
Mo61072	B14 x Mo22
CI.31A	Midland O.P.

K55 x CI.64

Line	Origin
33-16	
H30	
Ky27	
Ky49	
CI.49B	
K735	(K201 x K41)K201
K776	Southwestern Corn Borer Sel.
K789	K41 x Mo.22
K790	Pride of Saline O.P.
K791	Pride of Saline O.P.
K7-526	Pride of Saline O.P.
K7-540	Freed O.P.
K7-694	Southwestern Corn Borer Sel.
Ky57-235	Ky122 x C.P.
Mo2RF	B2 x 33-16[2/]
Mo2RH	B2 x 33-16[3/]
Mo2X4	33-16 x Boone Co.3B
Mo11903W	(K64/Mo22)(Boone Co.)

The following hybrids were nominated for 1958 AES tests:

Ill.1913	(R151 x R154)(WF9 x 38-11)
Ill.1918	(R151 x R153)(WF9 x 38-11)
Ill.1919	(R130 x R156)(WF9 x 38-11)
Ill.3136	(R74 x R101)(38-11 x K201)
Ind.6615	(H49 x H55)(H53 x B14) Retest
Ind.6874	(H49 x H52)(H59 x H60) Retest
K2606	(K41 x K723)(K728 x K741)
K4003	(K713 x K711)(K712 x Oh7B)
Ky2105	(Ky209 x Ky211)(33-16 x H21)
Ky5708	(CI.29C x CI.38B)(C103 x CI.21E)
Ky5712	(CI.64 x 33-16)(K55 x Ky201)
Mo.904-1	(Mo.9284 x Mo.9110)(Mo.9150 x Oh29)
Mo.958	(B41 x Oh7A)(Mo.3 x CI.21E) Retest
* Mo.4047BW	(K41 x H28)(K6 x K55)
U.S.619W	(CI.64 x K55)(Ky27 x Ky49) Retest
U.S.632	(CI.3A x CI.27)(CI.42A x CI.21E)

Natal South Africa - 3 hybrids

Standards:

U.S.523W	(K55 x K64)(Ky27 x Ky49)
Ky105	(T8 x CI.21E)(38-11 x Oh7B)

* Entered for observation only not as a candidate.

States entering hybrids in the AES tests should supply seed as follows:

Illinois	250 seeds	Missouri	400 seeds
Illinois Southern	100 seeds	Oklahoma	250 seeds
Indiana	325 seeds	Virginia	360 seeds
Kansas	400 seeds	Iowa (Corn borer)	50 seeds
Kentucky	400 seeds		

M. S. Zuber
F. A. Loeffel
W. R. Findley, Chairman

REPORT OF THE SUB-COMMITTEE ON UNIFORM TESTS IN THE 700 and 800 MATURITY SERIES

The uniform tests of the 800 maturity group were presented by Dr. John Lonnquist. The summarized results for the 1957 tests are presented in table 11 and the summarized results for the 1956 and 1957 tests are presented in table 12.

Dr. L. R. House MOVED that the hybrids Indiana 4655 and Indiana 5655 be designated AES 809 and AES 819, respectively. The motion was

Seconded by F. A. Loeffel and passed.

Dr. Lonnquist MOVED that Mo.4060A(w) be designated AES 811(w). The motion was

Seconded by Dr. L. R. House and passed.

Two sets of three-way crosses were produced in 1956 for testing in 1957. Combinations involving WF9 x 38-11 as the tester parent were produced by the Iowa Station and the combinations involving WF9 x Hy as the tester parent were produced by Dr. J. N. Lonnquist at Nebraska. The summarized data for these two sets of crosses are presented in table 13.

The uniform tests of the 700 maturity group were presented by Dr. John Lonnquist. The summarized results for the 1957 tests are presented in table 14 and those for the two-year period, 1956 and 1957 in table 15.

It was MOVED by Dr. R. W. Jugenheimer that Iowa 4879 be designated AES 704. The motion was

Seconded by Mr. G. H. Stringfield and passed.

Table 11. Summarized performance of AES hybrids and candidates: 800 maturity series. 1957

Hybrid	Pedigree	% Acre grain yield 1/	Moisture at harvest 1/	Days to ½ silk 2/	Lodging: Root 3/	Lodging: Stalk 1/	Dropped ears 4/	Ear Ht. 5/	Corn Borer leaf feeding 6/
		Bu.	Pct.	No.	Pct.	Pct.	Pct.	Score	Score
Standards									
U.S.13	(WF9x38-11)(HyxL317)	84.6	19.5	63.8	5.2	20.0	4.2	3.6	4.7
AES 808	(WF9x38-11)(Oh43ExH14)	84.7	20.0	62.9	5.4	16.8	4.8	3.1	5.5
Means		84.6	19.7	63.3	5.3	18.4	4.4	3.3	5.1
Nominations									
Ia. 4906	(WF9xB7)(B14XE39)	83.6	18.4	63.9	2.9	9.0	1.4	2.9	6.[illegible]
Ia. 4907	(WF9xB7)(B40xB14)	83.9	20.2	64.0	4.2	9.0	2.6	3.2	5.3
Ia. 4912	(WF9xB14)(HyxOh41)	84.6	20.8	63.9	4.5	15.5	1.5	3.4	4.0
Ind. 4655	(WF9xP8)(Oh43xC103)	87.4	20.9	63.0	4.4	6.4	2.2	3.0	6.0
Ind. 4656	(WF9xP8)(Oh43xH14)	84.6	21.0	63.1	3.4	15.1	3.9	3.1	5.5
Ind. 5655	(WF9xH50)(Oh45xOh7B)	90.9	20.0	64.1	4.8	8.2	1.9	3.1	5.3
Ind. 6623	(WF9xH52)(H53xC103)	81.7	20.1	66.5	3.2	8.9	4.9	3.4	4.0
Ind. 6833	(WF9xH52)(H54xH60)	88.1	19.5	64.8	0.8	9.2	5.9	3.5	6.0
Ill.1893	(C103x38-11)(Oh7BxOh29)	85.6	19.8	65.5	4.8	6.5	5.9	3.7	5.5
Ill. 1939	(R71xR98)(R105xR153)	82.3	23.0	64.5	4.7	9.2	1.4	3.4	5.0
Ill. 1981	(WF9x38-11)(Oh7xCI.21E)	91.0	20.0	64.9	6.0	12.6	3.2	3.3	6.5
Ill. 1992	(WF9xOh7A)(C103xB14)	81.3	20.2	64.8	2.8	4.2	4.9	3.1	7.3
Ill. 1996	(C103xB14)(Hy2xOh7)	89.0	20.9	65.0	4.2	5.9	2.0	3.3	7.3
K 1884	(N6xOh28)(HyxR59)	85.6	20.8	63.4	8.8	25.7	2.4	3.0	6.0
Mo. 406CA (w)	(N72xMo.1W)(K41xH30)	91.3	19.8	62.4	12.4	7.1	3.2	3.1	7.0
Means		86.1	20.4	64.2	4.8	10.2	3.1	3.2	5.8

1/ Ill., Ind., Ia., Kan., Ky., Mo., Nebr., Ohio
2/ Ill., Kan., Mo., Ohio
3/ Ind., Ia., Kan., Ky., Mo.
4/ Ia., Kan., Mo., Nebr.
5/ Ill., Ia., Kan., Ky., Mo.
6/ Iowa

Table 12. Summarized performance of AES hybrids and candidates. 800 uniform series. Two-year summary (1956-1957)

Hybrid	Acre grain yield	Moisture at harvest	Days to ½ silk	Lodging Root	Lodging Stalk	Dropped ears	Ear Ht.	Smutted plants	Blight H.turcicum	Blight H. maydis	Corn borer Infested plants	Corn borer Leaf feeding
	Bu.	Pct.	No.	Pct.	Pct.	Pct.	score	Pct.	Score	Score	Pct.	Score
Standards												
U.S. 13	86.0	17.6	65.9	2.8	23.4	10.0	3.8	2	4.5	3.0	27.1	5.1
AES 808	87.6	17.4	64.4	3.2	20.3	7.0	3.2	2	4.5	1.5	35.0	5.9
Means	86.8	17.5	65.2	3.0	21.9	8.5	3.5	2	4.5	2.2	31.0	5.5
Nominations												
Ia.4912	90.1	18.2	65.0	2.4	17.6	3.7	3.5	1	4.5	3.0	27.0	4.8
AES 809	89.6	18.5	64.5	2.2	8.8	3.0	3.2	1	3.5	0.5	31.9	5.4
AES 819	91.3	17.8	65.6	2.8	9.0	4.5	3.2	2	3.5	1.0	41.5	5.3
AES 811W	91.8	17.6	64.2	7.2	8.6	7.1	3.3	0	3.5	3.0	30.9	6.4
Means	89.9	18.1	64.8	3.2	12.2	4.6	3.3	1	3.8	1.7	35.4	5.4

Table 13. Summary of performance of uniform 800 maturity three-way crosses, 1957.

Hybrid	Acre grain yield			Moisture at harvest 3/	Days to ½ silk 4/	Lodging		Dropped ears 6/	ear height 7/	Corn borer
						Root 5/	Stalk 3/			Leaf feeding 8/
	Bu. 1/	Bu. 2/	Bu. 3/	Pct.	No.	Pct.	Pct.	Pct.	Score	Score
(WF9x38-11) x Hy	93.2	86.8	86.5	21.0	68.9	3.9	18.4	2.3	3.4	6.3
(WF9x38-11) x B44	93.3	88.1	85.9	19.9	69.8	0.2	8.7	1.9	2.9	6.7
(WF9x38-11) x CI.31A	104.7	99.1	97.5	24.0	70.0	4.6	9.8	2.2	3.4	4.3
(WF9x38-11) x K799	91.3	86.4	85.2	21.5	68.5	11.1	11.2	3.0	3.2	6.0
(WF9x38-11) x K800	80.7	76.0	75.9	19.1	68.4	9.5	17.3	3.4	3.4	9.0
(WF9x38-11)xMo.11662	100.7	94.9	94.2	19.7	68.2	3.3	9.4	1.0	3.2	6.3
(WF9x38-11)xMo.11276	88.5	82.5	82.7	21.5	69.4	0.2	9.8	5.5	2.7	7.0
(WF9x38-11) x Oh3F	89.9	84.6	83.4	23.0	70.2	1.4	2.2	3.4	3.1	8.3
(WF9x38-11) x Oh4G	102.4			25.4	73.7	1.3	6.5	0.6	3.2	4.3
(WF9x38-11) x Oh7N	100.1	94.3	93.8	20.0	69.9	4.5	13.3	4.2	3.0	3.3
(WF9x38-11) x R153	89.7	84.2	82.8	19.5	67.6	1.2	12.9	3.8	3.0	6.3
(WF9x38-11) x R154	97.5	92.0	91.0	18.6	67.4	6.3	16.4	2.7	3.2	8.0
(WF9x38-11) x R159	89.8	82.5		21.8	68.0	3.5	8.1	3.8	2.8	7.0
(WF9x38-11) x R166	83.4	78.6	77.6	19.2	68.1	4.7	19.9	3.3	2.8	6.7
(WF9x38-11) x R168	96.2	90.1		19.0	67.0	5.8	6.5	4.9	2.9	4.7
Means	93.4	87.2	86.4	20.9	69.0	4.1	11.4	3.1	3.1	6.3
U.S.13	101.7	95.2	94.8	22.1	68.8	6.2	14.9	4.5	3.8	4.7

1/ Nebr., Ill., Ind., Ia., Mo., and Ohio
2/ Nebr., Ill., Ind., Ia., Mo., Ohio and Kans.
3/ Nebr., Ill., Ind., Ia., Mo., Ohio, Kans. and Ky.
4/ Ill., Ind., Kans., and Ohio
5/ Ind., Ia., Kans., Ky., and Mo.
6/ Nebr., Ia., Kans., and Ky.
7/ Ill., Ind., Ia., Kans., Ky., and Mo.
8/ Iowa

Table 13. (cont'd.)

Hybrid	Acre grain yield	Moisture at harvest 3/	Days to ½ silk 4/	Lodging Root 5/	Lodging Stalk 3/	Dropped ears 6/	Ear height 7/	Corn Borer Leaf Feeding 8/
	Bu.: Bu.: Bu 3/	Pct.	No.	Pct.	Pct.	Pct.	Score	Score
(WF9xHy) x L317	99.5	22.2	68.9	11.6	28.2	5.5	3.6	4.7
(WF9xHy) x 38-11	95.8	19.8	68.5	3.2	22.4	7.6	3.5	6.7
(WF9xHy) x B44	91.8	21.3	68.2	0.6	14.5	3.1	3.0	7.7
(WF9xHy) x CI.31A	106.2	24.5	68.6	10.7	12.0	4.0	3.4	3.3
(WF9xHy) x K799	100.9	21.3	67.9	13.7	13.6	3.6	3.4	3.7
(WF9xHy) x K800	85.9	19.5	66.4	11.3	18.0	4.0	3.6	8.7
(WF9xHy) x Mo.11662	94.2	21.8	68.5	5.5	12.1	1.0	3.3	6.3
(WF9xHy) x Mo.11276	89.3	20.2	67.9	1.2	14.1	2.9	2.9	6.3
(WF9xHy) x Oh3C	87.5	24.4	69.0	1.6	2.2	3.9	3.0	6.7
(WF9xHy) x Oh3F	95.6	24.0	68.8	3.9	3.4	2.4	3.1	7.7
(WF9xHy) x Oh4G	94.7	25.8	69.9	3.2	8.2	1.6	3.2	4.7
(WF9xHy) x Oh7K	96.2	23.8	67.4	4.8	16.0	3.0	3.0	7.3
(WF9xHy) x Oh7N	103.9	21.4	67.4	5.4	14.3	4.0	3.0	3.7
(WF9xHy) x Oh7P	103.4	23.8	69.9	1.2	7.3	7.2	3.3	7.7
(WF9xHy) x R113	82.8	19.8	66.9	3.4	17.7	2.4	3.1	6.0
(WF9 xHy) x R153	99.8	23.0	66.6	8.7	14.4	1.9	3.3	8.7
(WF9xHy) x R154	96.1	19.0	66.5	8.7	27.5	2.4	3.5	8.7
(WF9xHy) x R159	93.8	20.7	66.5	4.6	8.6	1.2	3.3	7.0
(WF9xHy) x R166	85.3	19.6	66.1	1.6	26.6	1.2	2.8	7.3
(WF9xHy) x R168	95.4	19.3	66.0	4.6	8.7	2.1	3.2	4.3
Means	94.9	21.8	67.8	5.5	14.5	3.2	3.2	6.4

1/ Nebr.,Ill.,Ind.,Ia.,Mo., and Ohio
2/ Nebr., Ill., Ind., Ia.,Mo.,Ohio and Kans.
3/ Nebr.,Ill.,Ind.,Ia.,Mo.,Ohio,Kans. and Ky.
4/ Ill.,Ind.,Kans., and Ohio
5/ Ind.,Ia.,Kans.,Ky., and Mo.
6/ Nebr.,Ia.,Kans., and Ky.
7/ Ill.,Ind.,Ia.,Kans.,Ky., and Mo.
8/ Iowa

Table 14. Summarized performance of AES hybrids and candidates. 700 Maturity series. 1957.

Hybrid	Pedigree	Acre grain yield 1/	Moisture at harvest 1/	Days to ½ silk 2/	Lodging Root 3/	Lodging Stalk 1/	Dropped ears 4/	Ear ht. 5/	Smutted plants 6/
		Bu.	Pct.	No.	Pct.	Pct.	Pct.	Score	Pct.
Standards									
Ia.4297	(WF9xI205)(M14x187-2)	82.9	22.5	65.8	5.1	8.2	4.0	3.1	4.4
AES702	(WF9xHy2)(M14xC103)	96.4	24.4	69.0	5.3	8.6	4.3	3.1	0.0
Means		89.6	23.5	67.4	5.2	8.4	4.1	3.1	2.2
Nominations									
Ia.4809	(WF9xM14)(B14xB37)	89.7	23.8	66.5	3.0	4.3	0.7	3.0	1.8
Ia.4879	(WF9xOh43)(B14xB37)	101.1	24.8	65.8	3.2	2.6	1.3	3.2	2.2
Ia.4880	(WF9xOh43)(B14xB38)	99.8	24.9	65.8	0.7	4.2	2.2	3.0	1.8
Ill.1575	(WF9xM14)(L12xOh28)	98.9	23.9	66.2	5.0	8.0	1.6	3.0	3.0
Ill.3011	(WF9xB14)(C103xOh43)	100.7	25.1	66.5	1.8	3.1	1.9	3.1	2.5
Ill.3124	(WF9xHy2)(R71xR168)	92.9	23.7	66.2	1.5	5.2	3.1	3.2	0.5
Ill.1555A	(WF9xOh51A)(I224xOh28)	91.2	19.6	64.5	3.9	10.6	4.7	3.2	3.0
Ill.1936	(WF9xHy2)(B14 x M14)	91.4	23.7	66.5	1.8	4.8	2.7	3.0	0.0
Nebr. 1924	(WF9xHy2)(N6xB14)	100.4	24.8	67.2	0.8	7.4	3.3	3.2	1.8
CB 4726A	(WF9xB14)(Oh28xOh43)	95.2	23.6	65.2	1.9	4.9	1.8	2.7	1.3
Means		96.1	23.8	66.0	2.4	5.5	2.3	3.1	1.8

1/ Ill.,Ia.,Ind.,Kan.,Mo.,Nebr.,Mich.,Ohio
2/ Kan., Ohio
3/ Ind.Ia.,Kan.,Mo.,Mich.,Ohio
4/ Ia.,Kan.,Mo.,Nebr.
5/ Ill., Ia.,Kan.,Mo.,Ohio
6/ Ill., Ohio

Table 15. Summarized performance of AES hybrids and candidates: 700 maturity series.
Two-year summary (1956-1957)

Hybrid	Acre grain yield	Moisture at harvest	Days to ½ silk	Lodging Root	Lodging Stalk	Dropped ears	Ear ht.	Smutted plants	Blight H. turcicum	Blight H. maydis	Corn borer Infested plants	Corn borer Leaf feeding
	Bu.	Pct.	No.	Pct.	Pct.	Pct.	Score	Pct.	Score	Score	Score	Score
Standards												
Ia.4297	87.4	19.4	65.4	2.6	6.2	5.0	3.0	2.9	5.0	2.5		6.3
AES 702	97.2	20.9	67.5	3.1	10.8	6.0	3.2	0.7	2.5	1.5		7.0
Means	92.3	20.2	66.4	2.9	8.5	5.5	3.2	1.8	3.9	2.0		6.6
Nominations												
Ia.4809	90.8	20.0	65.2	1.5	3.0	2.8	3.1	2.6	4.5	1.5		6.3
Ia.4879	98.8	21.0	62.9	1.7	1.8	3.3	3.3	2.4	4.0	1.5		5.8
Ill.1936	93.4	20.2	65.8	1.2	4.8	4.8	3.2	1.2	4.5	2.0		5.8
Nebr.1924	98.2	21.1	66.1	0.4	5.4	5.4	3.2	1.6	4.0	3.0		5.8
Means	94.6	20.0	64.8	1.5	4.4	4.6	3.2	2.1	4.2	2.3		6.1

REPORT OF THE SUB-COMMITTEE ON UNIFORM TESTS IN THE 400, 500 and 600 MATURITY SERIES

The uniform tests of the 400, 500 and 600 maturity groups were presented by Dr. E. C. Rossman. The summarized results for the 1957 tests are presented in table 16. The summary of the tests conducted in 1956 and 1957 are presented in table 17.

It was MOVED by Dr. L. R.House that the Indiana hybrid 5409 be given the permanent designation AES601. The motion was

Seconded by Dr. E. H. Rinke
and passed.

Illinois hybrid 1863 was also eligible for an AES designation. However, no State, other than Illinois was interested in this hybrid and no AES number was assigned.

Four sets of three-way crosses were produced in 1956 for testing in 1957. Two of the sets, WF9 x M14 and WF9 x Oh51A as testers, were grown at 8 locations. The summarized data are presented in table 18. The same series of inbred lines were crossed to two additional testers, W32 x W64A and WR3 x W64A, and tested at only three locations. The data from these tests plus the data from the other two tester sets grown at the same location are presented in table 19.

Table 16. Summarized performance for AES hybrids and candidates; 500 and 600 maturity series. 1957.

Hybrid	Moisture %	Bu. per acre	Stalk lodging %	Root lodging %	Smuting %	Shelling %	Ear height score	Ear height inch	Dropped ears %	Corn borer rating 1/
						Ill.	Ohio	Ill.	Iowa	Iowa
No. of Tests	(8)	(8)	(6)	(5)	(2)					
Ohio M15	24.3	86.6	16.2	3.1	1.4	76	4.8	46	1.0	8.0
AES 510	25.4	97.8	4.7	1.0	3.0	77	4.0	41	2.9	7.5
AES 601	27.6	103.4	3.2	0.6	1.0	77	4.3	41	0.0	7.5
Mich.53-151	24.1	96.3	4.7	1.2	5.9	77	4.0	43	3.8	7.0
CB4603(Minn.)	25.2	98.9	2.2	0.3	3.3	77	4.0	43	0.9	8.0
CB4621 (Minn.)	24.1	99.8	2.3	0.4	1.4	77	4.3	40	0.9	6.7
Ohio K24	25.5	93.5	6.1	2.1	5.4	76	4.0	38	1.0	5.7
AES610	25.5	91.1	5.0	0.6	1.8	78	3.5	38	0.0	6.3
Ill.1863	28.7	101.4	1.8	0.5	1.4	77	4.0	41	2.9	6.7
Ill.1864	27.7	103.4	3.2	0.9	2.2	77	4.0	40	2.3	5.7
Ill.1960	26.4	102.2	2.8	0.2	1.3	78	4.3	45	0.9	6.0
Ill.3016	30.5	101.2	1.9	0.2	1.0	74	4.0	40	1.0	7.7
Ind.6225	25.6	105.4	3.7	0.4	3.9	78	4.3	46	0.0	7.7
Ia.4757	25.6	99.5	5.8	5.8	0.5	77	1.8	43	0.0	6.3
Ia.4779	28.2	98.3	3.7	0.4	0.9	77	1.8	40	0.0	7.0
Mich. 52-25	25.2	99.8	3.0	1.4	3.6	79	4.0	40	3.7	6.7
Mich. 54-70	26.7	93.6	4.1	0.2	0.8	78	3.7	39	1.9	6.7
Mich. 54-116	25.1	86.9	3.7	0.8	5.4	79	3.3	39	0.9	7.0

Hybrid	Days to silk	Leaf blight score 2/	Aphids %	Husk cover score 3/	Bird injured plants %
No. of Tests	Ohio	Ohio	Ohio	Ohio	Ohio
Ohio M15	71.5	1.8	4.2	3.0	2.5
AES 510	72.0	3.3	0.0	4.0	1.7
AES 601	73.0	3.0	2.7	3.8	0.0
Mich. 53-151	73.0	3.0	0.8	2.7	9.2
CB4603 (Minn.)	71.5	4.3	2.5	2.8	0.8
CB4621 (Minn.)	72.0	4.0	1.7	3.0	8.4
Ohio K24	72.0	2.5	0.8	2.5	8.3
AES 610	70.0	1.5	0.8	2.8	10.7
Ill. 1863	72.5	2.0	0.8	2.8	3.3
Ill.1864	73.0	2.5	3.4	3.5	0.8
Ill.1960	72.5	3.3	4.2	3.0	3.3
Ill.3016	75.0	1.3	1.7	3.5	0.0
Ind.6225	72.5	3.8	3.7	3.0	6.8
Ia.4757	73.0	2.0	0.8	2.8	3.3
Ia.4779	73.0	1.5	3.4	2.8	1.7
Mich. 52-25	70.0	3.3	0.8	2.7	4.2
Mich. 54-70	72.0	3.0	0.0	3.0	2.5
Mich. 54-116	68.5	3.0	5.0	3.5	1.7

1/ Rated ---1= resistant, 9= susceptible
2/ Rated----1 = least, 5 = most
3/ Rated ---1 = shortest, 5 = longest

Table 16. (cont'd.)

Ohio M15 (Oh51 x Oh26)(A x W23)	500	Ill.1864(M14xWF9)(Oh43xW22)	600
AES510 (WF9 x W22)(H19 x B9)	500	Ill.1960(M14xW64A)(B14xA545)	600
AES 601 (WF9 x W22)(M14 x B14)	500	Ill.3016(WF9xB14)(B37xOh43)	600
Mich.53-151(WF9xMs209)(Ms106 x Ms107)	500	Ind.6225**(W64AxM14)(B14xA297)	600
CB4603(Minn.)*(A295xW64A)(B14xA297)	500-600	Ia.4757(WF9xM14)(B16xOh51A)	600
CB4621(Minn.(A295xW64A)(B14xA239)	500-600	Ia.4779***(WF9xM14)(Oh43xOh51A)	600
Ohio K24(Oh51AxWF9)(Oh33xOh40B)	600	Mich.52-25(WF9xM14)(Oh51AxMS212)	600
AES610 (M14xA73)(Oh43xOh51A)	600	Mich.54-70(WF9xMS107)(Oh43xMS208)	600
Ill.1863 (M14xWF9)(I205xOh43)	600	Mich.54-116(WF9xMS120)(Oh43xMS211)	600

* Same pedigree as Ill.3002
** Same pedigree as Ill.1959
*** Same pedigree as Ill. 1862

NOTE--Iowa used Ia.4947 (WF9 x M14)(A257 x Oh51A) in place of Ia.4779 in their trial.
Insufficient seed of Ia. 4779.

STATE	MOIS-TURE	YIELD	STALK LODG-ING	ROOT LODG-ING	SHELL o/o	SMUT o/o	DROPP-ED EARSo/o	CORN BORER RATING	DAYS TO SILK	LEAF BLIGHT SCORE	APHIDS o/o
Illinois	X	X	X		X	X					
Iowa	X	X	X	X			X	X			
Michigan	X	X	X	X							
Minnesota	X	X	X	X							
Nebraska	X	X	X	X							
Ohio	X	X	X	X		X			X	X	X
South Dakota	X	X									
Wisconsin	X	X									

STATE	EAR HEIGHT	BIRD INJURY	HUSK COVER SCORE
Illinois	X		
Iowa			
Michigan			
Minnesota			
Nebraska			
Ohio	X	X	X
South Dakota			
Wisconsin	X	X	X

Table 17. Summarized performance for AES hybrids and candidates, 500 and 600 Maturity series. 1956 and 1957

Hybrid	Moisture o/o	Bu. per acre	Stalk lodging o/o	Root lodging o/o	Smut o/o	Days to silk	Dropped ear o/o	Corn borer rat.1/	Shell o/o
No. of Tests	(15)	(15)	(11)	(9)	(3)	(2)	(4)	(2)	(2)
Ohio M15	23.2	84.3	21.2	1.8	2.6	71.3	3.8	6.9	76
AES 510	24.0	91.9	9.8	0.8	5.5	72.0	5.2	6.8	80
AES 601	25.3	98.4	6.0	0.3	1.5	72.8	2.1	7.3	79
Mich.53-151	22.8	93.2	10.1	1.2	4.4	72.5	8.3	6.4	79
CB4603(Minn.)	23.7	93.6	8.6	0.3	3.1	71.3	3.7	7.3	79
CB4621(Minn.)	22.7	91.7	7.9	0.2	1.7	71.3	3.1	6.5	80
Ohio K24	24.5	91.1	9.4	1.1	8.0	71.0	2.2	5.4	79
AES 610	25.1	89.6	9.8	0.3	2.3	70.3	2.5	6.2	80
Ill.1863	27.1	97.0	5.2	0.3	2.6	71.5	3.5	5.9	78
Ia.4757	24.3	96.8	13.8	3.3	1.7	72.5	7.2	6.2	80
Ia.4779	26.6	94.1	6.3	0.2	1.4	71.8	2.4	6.7	79
Mich.52-25	24.2	96.1	9.7	0.9	1.8	69.8	4.5	6.4	81

Hybrid	Ear height Score	Ear height Inches	Bird Injury o/o	Husk cover score2/	Leaf blight score3/
No. of tests	(3)	(2)	(2)	(2)	(2)
Ohio M15	4.1	--	8.0	2.8	3.4
AES 510	3.6	41	1.9	3.9	4.2
AES 601	4.1	41	4.8	3.7	4.0
Mich.53-151	3.9	44	19.0	1.9	4.0
CB4603 (Minn.)	3.9	44	8.2	2.6	4.4
CB4621 (Minn.)	3.9	43	9.0	2.9	4.5
Ohio K24	3.6	40	18.1	2.5	3.5
AES610	3.2	38	14.5	2.6	3.0
Ill.1863	3.8	42	12.7	2.4	2.8
Ia.4757	2.7	44	7.4	2.8	2.8
Ia.4779	2.4	40	10.5	2.2	2.8
Mich.52-25	3.5	38	11.3	2.3	3.4

1/ Rated -- 1 = resistant, 9 = susceptible
2/ Rated -- 1 = shortest, 5 = longest
3/ Rated -- 1 = least, 5 = most

	Ill.	Ind.	Iowa	Mich.	Minn.	Nebr.	Ohio	S.D.	Wis.	USDA
Moisture o/o	AB	A	AB	AB	AB	B	AB	B	AB	
Bushels per/acre	AB	A	AB	AB	AB	B	AB	B	AB	
Stalk lodg.o/o	B	A	AB	AB	AB	B	AB			
Root lodg.o/o		A	AB	AB	B	B	AB			
Smut o/o							AB			
Days to silk							AB			
Dropped ears o/o	A		AB		A					
Corn borer rat.			AB							
Shelling o/o	AB									
Ear height-score			A				AB			
Ear height-inches	AB									
Bird injury o/o							AB			
Husk cover score							AB			
Leaf blight score							B			A

Table 18. Summary of performance of uniform 500 and 600 maturity three-way hybrids.

Hybrid	Moisture	Bu. per acre	Stalk lodging	Root lodging	Smut	Bird damage	Ear height Inch.	Ear height score	Days to silk
	Pct.		Pct.	Pct.	Pct.	Pct.			
(WF9xM14) x Oh26D	22.2	96.2	5.0	6.5	0.4	1.8	30	3.5	71.5
" x W136A	25.5	99.2	3.5	5.6	1.0	0.9	35	3.5	74.3
" x W202	25.5	99.3	3.1	0.2	4.4	7.8	33	4.0	70.3
" x W20R	25.9	98.7	4.2	1.0	0.9	2.7	35	3.7	73.0
" x R165	27.7	101.3	4.1	2.5	1.5	1.6	33	3.7	73.0
" x R168	24.8	109.9	4.5	0.9	2.9	1.2	36	4.0	72.0
" x R172	26.0	102.0	3.1	0.2	0.6	1.4	37	4.0	71.8
" x A257	25.6	103.1	0.9	0.5	0.0	4.0	33	3.7	73.5
" x A296	20.9	86.2	5.5	0.0	1.9	4.6	29	3.0	70.0
" x A568	23.9	98.6	5.4	1.4	0.9	3.2	34	3.5	71.8
" x A569	22.9	93.3	7.6	0.2	0.9	0.9	34	3.2	71.8
" x MS109	28.2	103.2	1.2	0.2	0.9	1.5	38	4.0	77.3
" x MS111	26.1	106.2	2.7	0.0	3.1	6.5	33	3.5	70.0
" x MS121	27.1	98.3	1.9	1.1	6.1	1.9	30	3.5	74.0
" x MS125	26.1	92.7	1.7	0.0	3.2	7.0	34	3.7	73.5
" x MS126	27.2	104.6	4.1	1.6	1.4	1.5	34	3.7	73.3
" x Iowa 24	27.8	108.1	8.8	2.9	1.4	1.8	35	4.0	73.8
" x B47	24.4	101.6	7.2	5.7	4.5	3.6	37	4.2	71.3
" x Iowa 6	27.8	97.6	4.7	0.0	0.0	6.3	33	3.5	71.8
(WF9 x Oh51A) x Oh26D	22.2	82.8	6.0	0.2	0.5	2.2	31	3.5	71.8
" x W136A	23.6	95.4	5.1	2.8	5.2	1.0	34	4.0	71.8
" x W202	24.1	98.7	3.6	0.0	3.4	3.6	34	4.0	67.5
" x W20R	26.7	103.6	4.4	3.4	3.7	2.2	35	3.7	71.8
" x R165	28.2	97.7	5.2	8.2	1.7	2.4	30	3.7	72.0
" x R168	24.1	101.3	1.9	2.1	1.0	1.5	35	4.2	71.3
" x R172	25.5	93.8	2.7	0.2	1.4	2.0	38	3.7	71.8
" x A257	25.2	99.7	1.8	0.3	0.9	5.7	33	4.0	72.0
" x A296	20.7	92.5	4.2	0.6	2.9	3.6	33	3.5	67.8
" x A568	22.1	97.7	5.7	1.9	1.8	2.2	34	3.5	68.5
" x A569	22.5	103.3	7.0	0.1	0.5	2.0	35	3.7	70.3
" x MS109	27.0	100.2	1.0	0.5	0.5	2.7	37	4.0	74.0
" x MS111	25.5	92.4	2.4	1.0	3.7	11.9	33	3.2	66.5
" x MS121	25.5	98.6	1.6	3.5	2.6	4.0	30	3.5	72.0
" x MS125	24.9	88.2	2.2	0.1	6.5	13.7	34	4.0	71.5
" x MS126	27.2	98.5	6.5	2.0	2.5	1.0	36	4.0	72.8
" x Iowa 24	27.2	104.3	4.1	1.7	0.9	1.9	37	4.2	70.5
" x Iowa 26	25.4	105.1	7.8	2.5	3.1	1.0	35	3.7	71.5
" x B47	24.5	100.6	3.7	1.5	2.4	7.6	37	4.0	70.3
" x Iowa 6	26.1	93.2	6.8	0.2	3.0	3.3	33	3.7	70.3

Table 18. (cont'd.)

Hybrid	Plant height	Shell	Dropped ears	Corn borer rating	Leaf blight	Aphids infest.	Husk cover
	In.	Pct.	Pct.	1-9	score	Pct.	score
(WF9 x M14) x Oh26D	93	76	4.9	8.7	1.7	9.2	4.5
" x W136A	101	77	1.1	7.0	3.3	5.1	4.5
" x W202	100	74	1.0	8.3	2.5	16.8	2.8
" x W20R	99	74	1.9	6.7	2.8	0.8	3.7
" x R165	104	72	1.0	7.3	2.8	4.2	3.7
" x R168	104	77	1.8	5.7	1.5	1.7	3.2
" x R172	103	72	0.0	6.7	1.8	4.3	3.2
" x A257	104	73	6.2	8.7	3.3	12.6	2.2
" x A296	93	79	1.1	7.7	4.8	5.1	2.2
" x A568	101	78	1.1	8.0	2.8	4.2	3.2
" x A569	96	75	0.0	7.0	4.5	5.9	3.2
" x MS109	110	75	0.9	8.3	1.8	1.7	3.0
" x MS111	102	78	1.9	6.7	1.3	4.2	2.7
" x MS121	96	69	4.3	7.3	2.3	4.2	3.5
" x MS125	101	73	4.9	5.0	3.0	0.8	2.5
" x MS126	107	76	2.0	7.7	1.0	4.2	3.7
" x Iowa 24	101	72	10.6	6.7	2.0	1.7	2.7
" x B47	99	77	1.0	8.0	3.8	5.9	2.7
" x Iowa 6	97	74	2.8	7.7	1.5	1.7	2.7
(WF9 x Oh51A) x Oh26D	95	70	3.2	8.7	1.0	2.6	4.2
" x W136A	107	79	1.0	7.7	2.3	6.8	4.0
" x W202	103	77	0.0	8.3	2.5	6.8	3.0
" x W20R	105	73	0.0	5.3	1.5	0.0	3.5
" x R165	109	73	1.0	8.0	1.8	0.8	3.7
" x R168	102	77	0.0	5.3	0.0	0.0	3.2
" x R172	105	75	0.0	7.0	1.8	0.0	3.2
" x A257	99	74	1.1	8.0	2.3	8.4	2.7
" x A296	101	83	6.3	7.0	3.8	0.0	2.7
" x A568	96	77	0.0	6.3	2.0	0.0	3.0
" x A569	99	76	0.0	6.7	2.5	0.8	3.5
" x MS109	109	77	0.8	8.0	1.3	0.0	3.2
" x MS111	93	76	0.0	6.0	1.3	0.6	2.2
" x MS121	95	70	0.0	6.7	2.3	2.5	2.7
" x MS125	97	75	3.3	4.3	2.3	0.0	1.7
" x MS126	103	77	2.0	6.0	0.8	4.1	3.2
" x Iowa 24	98	69	5.3	4.7	2.5	0.0	3.0
" x Iowa 26	100	74	1.1	5.7	0.0	0.0	4.5
" x B47	95	78	3.2	6.0	3.5	0.8	2.5
" x Iowa 6	96	74	1.0	6.0	1.5	4.2	3.7

	Ill.	Ind.	Iowa	Mich.	Minn.	Mo.	Ohio	Wis.
Moisture o/o	X	X	X	X	X	X	X	X
Bushels per acre	X	X	X	X	X	X	X	X
Stalk lodging o/o	X	X	X	X	X	X	X	
Root lodging o/o	X	X	X	X	X	X	X	
Smutted plants o/o	X						X	
Bird damage plants o/o		X					X	
Ear height, inches	X	X						
Ear height, score							X	
Days to silk		X					X	
Plant height, inches		X						
Dropped ears, o/o			X					
Corn borer rating			X					
Leaf blight score							X	
Aphid infested plants o/o							X	
Husk cover score							X	

Table 19. Summary of performance of uniform 500 and 600 maturity three-way hybrids.

Hybrid	Av. from Minn., Wis., and Mich.				Av. from Wis. & Mich.	
	Moisture	Bu. per acre	Stalk lodging 1/	Root lodging 1/	Moisture	Bushels per acre
	Pct.		Pct.	Pct.	Pct.	
(WF9 x M14) x Oh26D	22.2	104.1	1.2	0.8	23.1	105.3
" x W136A	25.5	111.1	1.4	14.8	28.3	109.0
" x W202	25.5	104.3	1.7	0.0	26.5	97.4
" x W20R	25.9	104.7	1.3	3.0	28.3	95.6
" x R165	27.7	112.0	0.6	0.7	27.7	105.3
" x R168	24.8	113.9	0.8	1.6	25.1	109.1
" x R172	26.0	109.5	0.0	0.0	25.7	107.0
" x A257	25.6	113.5	0.6	0.0	27.9	109.4
" x A296	20.9	92.1	2.9	0.0	21.2	80.1
" x A568	23.9	105.2	2.9	2.7	24.1	100.4
" x A569	22.9	102.5	5.9	0.0	24.0	99.4
" x MS109	28.2	114.3	0.3	0.0	29.9	107.0
" x MS111	26.1	112.1	0.6	0.0	26.9	109.6
" x MS121	27.1	108.8	0.3	0.9	28.3	104.7
" x MS125	26.1	108.1	0.9	0.0	24.5	110.7
" x MS126	27.2	105.3	2.3	3.2	29.0	95.9
" x Iowa 24	27.8	114.8	2.7	6.9	28.4	109.6
" x B47	24.4	109.7	1.9	5.2	25.7	104.7
" x Iowa 6	27.8	105.2	3.3	0.0	28.6	103.5
(WF9 x Oh51A) x Oh26D	22.2	86.4	2.4	0.0	23.6	84.2
" x W136A	23.6	100.3	2.3	4.3	25.4	100.0
" x W202	24.1	105.0	2.1	0.0	25.2	103.1
" x W20R	26.7	108.6	1.0	2.4	29.4	104.0
" x R165	28.2	105.1	2.7	7.3	29.5	101.7
" x R168	24.1	109.6	0.8	0.0	24.3	108.7
" x R172	25.5	101.1	1.1	0.0	25.7	100.6
" x A257	25.2	107.4	0.7	0.0	25.6	103.5
" x A296	20.7	93.6	0.5	0.0	20.9	89.2
" x A568	22.1	98.2	1.8	1.0	22.5	87.5
" x A569	22.5	106.3	6.4	0.4	24.5	104.5
" x MS109	27.0	107.7	0.9	0.0	28.5	99.4
" x MS111	25.5	97.0	1.4	0.5	25.8	90.7
" x MS121	25.5	104.0	0.8	1.3	26.7	98.0
" x MS125	24.9	97.2	0.0	0.0	23.4	93.5
" x MS126	27.2	80.2	2.7	1.7	25.6	102.6
" x Iowa 24	27.2	104.8	2.6	1.7	28.9	102.4
" x Iowa 26	25.4	107.1	1.6	2.2	25.8	98.7
" x B47	24.5	105.0	1.4	0.0	27.1	99.7
" x Iowa 6	26.1	97.3	5.2	0.5	27.5	98.1
(W32 x W64A) x Oh26D	25.1	92.8	3.5	0.0	23.3	92.8
" x W136A	27.8	109.2	1.9	7.5	25.2	107.5
" x W202	28.4	99.9	1.8	0.0	26.4	95.6

Table 19 (cont'd.)

Hybrid	Av. from Minn., Wis., and Mich. Moisture	Bushel per acre	Stalk lodging 1/	Root lodging 1/	Av. from Wis. & Mich. Moisture	Bushels per acre
	Pct.		Pct.	Pct.	Pct.	
(W32 x W64A) x W20R	32.1	116.0	1.7	2.4	29.7	115.4
" x R165	32.2	111.6	3.5	6.7	29.4	104.1
" x R168	28.8	113.5	0.4	0.5	27.1	114.4
" x R172	29.1	108.0	0.5	0.0	26.6	108.0
" x A257	28.6	106.3	2.0	0.0	26.7	105.9
" x A296	25.4	86.6	7.6	0.0	23.3	84.8
" x A568	26.9	104.9	9.0	1.4	24.4	107.3
" x A569	25.2	103.6	13.4	1.7	22.8	108.0
" x MS109	29.1	110.0	1.3	0.0	26.2	105.4
" x MS111	29.2	112.0	1.4	0.4	26.4	115.1
" x MS121	31.0	108.7	0.4	0.0	29.0	109.0
" x MS125	29.1	102.1	0.0	0.0	25.8	101.1
" x MS126	31.2	112.9	4.0	6.0	28.4	113.8
" x Iowa 24	30.9	125.4	2.7	4.9	28.2	124.0
" x Iowa 26	29.2	114.0	7.0	4.9	26.7	113.7
" x B47	26.8	106.5	6.2	6.8	24.9	105.8
" x Iowa 6	31.9	95.7	7.5	0.0	29.5	96.1
(WR3 x W64A) x Oh26D					20.6	92.4
" x W136A					23.5	98.0
" x W202					25.8	87.3
" x W20R					28.9	108.5
" x R165					28.1	109.3
" x R168					25.4	98.6
" x R172					25.3	106.1
" x A257					25.4	106.5
" x A296					22.4	85.0
" x A568					23.7	95.0
" x A569					21.0	107.0
" x MS109					27.1	100.7
" x MS111					27.0	101.2
" x MS121					25.5	100.7
" x MS125					23.4	95.7
" x MS126					27.1	106.3
" x Iowa 24					28.7	104.0
" x Iowa 26					24.0	115.5
" x B47					23.0	103.9
" x Iowa 6					27.8	93.2

1/ Stalk and root lodging = Minnesota and Michigan

Inbred	Origin	Inbred	Origin
Oh26D	(Composite of Oh26 recoveries)	A569	(A73 x Murdock)
W136A		MS109	(W10 x Oh40B)
W202		MS111	(Oh40B x R53)
W20R		MS121	(Pioneer 373)
R165		MS125	(L317 x MS50)
R168		MS126	(L317 x MS211)
R172		Iowa 24-3-1-2-1-2	(Minn. Syn. 1)
A257	(A73 x Os420)	Iowa 26-5-2-2-1	(M14 x A206)xOh4C
A296	(A340 x Mo.940)	B47	(A392 x R61)
A568	(Golden Jewel)	Iowa 6-2-2-1	(Minn. Syn.2)

Three-way seed involving a different set of 20 inbreds and 3 testers was produced in 1957 for 1958 testing as follows:

INBREDS

1. Ia. 55-1473 (Minn. Syn. 1) - 11 - 1
2. Ia. 55-1487 (Minn. Syn. 2) - 9 - 2
3. Ia. 55-1716 (Pioneer multiple cross) - 33 - 2-2
4. Oh26F (Composite Oh26 recovery)
5. Oh45S (M14 x 187-2) Oh45 x Oh45
6. W212 (O.P. Western Plowman x W52)
7. W220 (O.P. Wis. No. 25)
8. W375 R5 (Rec.A375 Longeared O.P.)
9. A427 (CC36 x A405)
10. A570 (Minn. C.B. Syn. No. 2)
11. R151 59A (7-8-9-0-1-2-3)
12. R180 (R76 x WF9)
13. R181 323 (2) S6
14. R182 R75 x Oh51A
15. R183 C103 x A71
16. MS68 MAC Open Pollinated
17. MS116 Duncan Open Pollinated
18. MS127 (Oh40B x Hy) x MS24A
19. MS128 (Ohio M15)
20. MS129 (Hy2 x MS113)

This three way seed will be tested by the following states in 1958.

(WF9 x M14) Seed from Illinois	(Oh51A x Oh26D) x (Oh26A x Oh26F) Seed from Ohio	W64A x Oh43 Seed from Michigan
Indiana (200 seeds)		Indiana (200 seeds)
Wisconsin (250)	Indiana (200 seeds)	Iowa (220)
Iowa (220)	Michigan (270)	Illinois (250)
Illinois (250)	Ohio	Nebraska (200)
Minnesota (380)		Minnesota (380)
Michigan (270)		Michigan (270)
South Dakota (250)		Ohio (250)
		South Dakota (250)

Since very few new inbreds were nominated for seed production as single crosses or three-way hybrids in 1958, the committee decided to defer seed production until 1959.

The 1958 tests of AES hybrids and candidates will include the following entries:

New Nominations	Maturity	Seed from
Iowa 4947 (WF9 x M14) (Oh51A x A257)	600	Iowa
Iowa 5053 (WF9 x M14) (A257 x W182D)	600	Iowa
Illinois 3007 (R61 x WF9) (R169 x B14)	600	Illinois
Illinois 3009 (B14 x B21) (A297 x W64A)	600	Illinois
Illinois 3043 (R71 x R109 B) (WF9 x B14)	600	Illinois
Illinois 3152 (M14 x WF9) (B14 x Oh43)	600	Illinois
Minnesota 200 (B14 x A239) (M14 x W64A)	500	Minnesota
Minnesota 201 (WF9 x Oh51A) (B14 x M14)	500	Minnesota

Retest Nominations	Maturity	Seed from
Illinois 1864 (M14 x WF9) (Oh43 x W22)	600	Illinois
Illinois 1960 (M14 x W64A) (B14 x A545)	600	Illinois
Indiana 6225 (W64A x M14) (B14 x A297)*	600	Indiana
Minn. CB 4603 (A295 x W64A) (B14 x A297)**	500-600	Minnesota
Minn. CB 4621 (A295 x W64A) (B14 x A239)	500-600	Minnesota
Michigan 53-151 (WF9 x MS209) (MS106 x MS107)	500	Michigan

Standards	Maturity	Seed from
Ohio M15 (Oh51 x Oh26) (A x W23)	500	Ohio
AES 510 (WF9 x W22) (H19 x B9H)	500	Indiana
Ohio K24 (Oh51A x WF9) (Oh33 x Oh40B)	600	Ohio
AES 601 (WF9 x W22) (M14 x B14)	600	Indiana
AES 610 (M14 x A73) (Oh43 x Oh51A)	600	Minnesota

The following states plan to conduct these AES trials in 1958:

State	Seeds
Illinois	400
Iowa	220
Minnesota	380
Nebraska	250
Ohio	250
South Dakota	250
Wisconsin	400
Michigan	270
Missouri	200
Indiana	325

N. P. Neal
G. H. Stringfield
E. C. Rossman, Chairman

REPORT OF THE SUB-COMMITTEE ON UNIFORM TESTS IN THE 100, 200 and 300 MATURITY SERIES

The uniform tests of the 100, 200 and 300 maturity groups were presented by Mr. Wm. Wiidakas. The summarized results for the 1957 tests of the 300 maturity series are presented in table 20. The summarized results for the 1957 tests of the 100 and 200 maturity series are presented in table 21. Since this was the first year of test for this material none of the entries were eligible for consideration for AES designations.

Table 20. Summarized performance of AES candidates, 300 maturity series. 1957.

	Moisture %							Yield - bushels						
	3	2	1	3	1 Areas		%	3	2	1	3	1 Areas		%
	N.D.	Minn.	Wis.	Mich.	S.D.	Av.	W355	N.D.	Minn.	Wis.	Mich.	S.D.	Av.	W355
W1681	37.3	35.0	32.5	39.7	35.0	35.9	92	60.0	66.6	105.2	50.0	48.6	66.1	100
MS53-4523	37.1	36.3	32.2	37.6	38.7	36.4	93	68.7	68.4	106.8	62.1	58.1	71.2	111
MS53-4524	35.7	37.1	31.2	40.8	39.0	36.8	94	72.1	69.1	104.2	58.5	49.8	70.7	110
CB5303	37.3	37.1	34.5	39.9	38.3	37.4	95	66.8	69.0	90.2	46.5	48.8	64.3	100
MS53-4544	36.2	37.7	35.3	41.9	39.4	38.1	97	73.0	72.1	105.9	58.0	52.7	72.3	113
MS54-27	38.9	37.8	34.4	46.2	40.9	39.6	101	75.7	80.5	112.8	55.6	56.0	76.1	119
W355	38.0	38.4	36.2	39.7	43.8	39.2	100	62.3	64.3	105.0	54.7	34.2	64.1	100
MS250	37.3	32.5	32.6	39.6	-	-	-	64.8	69.0	106.0	53.5	-	-	-
ND502	32.3	35.6	31.4	38.0	-	-	-	67.5	69.0	95.1	47.5	-	-	-
ND 307	31.9	-	27.9	33.3	-	-	-	69.9	-	100.0	47.0	-	-	-

	Root lodging %				Plant breakage %				Rating 1 to 5			Ear lgth.	Rows seed
									Plant		Ears		
	N.D.	Minn.	Mich.	Av.	N.D.	Minn.	Mich.	Av.	N.D.	Minn.	N.D.	Minn.	Minn.
W1681	14.0	60.0	4.7	26.2	10.1	1.3	1.5	4.3	1.5	3	2.3	8.6	16
MS53-4523	16.1	37.1	1.0	18.1	4.2	1.3	0.5	2.0	1.0	1	2.0	8.8	16
MS53-4524	16.5	45.7	3.3	21.8	10.5	1.7	0.0	4.1	1.0	1	2.0	8.6	15
CB5303	8.2	34.0	1.2	14.5	3.5	0.0	0.7	1.4	1.2	2	2.8	8.4	15
MS53-4544	17.1	52.9	1.5	23.8	2.3	1.7	0.4	1.5	1.5	1	1.2	8.8	15
MS54-27	15.1	54.3	2.3	23.9	2.8	1.3	1.4	1.8	1.0	2	2.5	8.8	15
W355	12.0	52.9	0.5	21.8	3.2	0.4	1.6	1.7	1.2	2	3.0	7.8	16
MS250	9.1	27.0	1.8	12.6	3.1	0.4	0.4	1.3	1.0	-	2.8	7.5	15
ND502	25.0	27.0	1.2	17.7	5.1	0.3	1.1	2.2	3.0	-	2.4	8.0	16
ND 307	16.0	-	4.3	-	9.1	-	3.0	-	1.4	-	2.8	-	-

		Smut %		Husking		Height N.D.		Shelling %	
No.	Pedigree	N.D.	Minn.	N.D.	Wis.	Pl.	Ears	N.D.	Wis.
W1681	W297xA498 : W182BxW79	1.6	3.3	ME	E	92	34	87.0	86.3
MS53-4523	B8xMS116 : W10xMS206	1.1	0.8	ME	E	97	38	86.4	85.1
MS53-4524	B8xMS211: W10xMS206	0.8	4.3	M	-	98	38	85.5	83.8
CB5303	CM145xMS1334 : SD48xA90	1.4	0.0	Mh	-	92	30	82.6	81.0
MS53-4544	MS116xMS211: W10xMS206	0.6	2.8	E	-	100	38	86.0	84.4
MS54-27	B8xMS211 : MS114xMS116	0.9	0.8	ME	-	102	40	85.6	84.9
W355	W9xWM13 :W25xW153	1.2	1.5	M	-	92	36	84.9	82.5
MS250	OH51xR53 : W10xMS206	1.1	-	M	-	100	36	84.2	84.6
ND502	A498xMS1334 : A508xA509	1.8	-	M	-	86	30	82.0	80.0
ND307	ND230xND203: A90xMS1334	0.9	-	M	-	90	30	82.0	80.7

Table 21. Summarized performance of AES hybrids and candidates, 100 and 200 maturity series. 1957.

	Moisture %							Yield - bushels per acre						
	3	2	1	3	1	Areas	%	3	2	1	3	1	Areas	%
	N.D.	Minn.	Wis.	Mich.	S.D.	Av.	240	N.D.	Minn.	Wis.	Mich.	S.D.	Av.	240
AES101	28.0	23.2	20.4	26.3	21.5	23.9	80	52.0	60.7	85.2	40.9	50.6	57.9	96
W1640	31.6	25.7	24.4	31.6	24.4	27.5	92	53.8	60.7	93.5	49.4	51.2	61.7	103
W240	33.0	27.1	27.5	30.7	31.9	30.0	100	47.6	67.0	90.6	42.9	53.1	60.2	100
W630	34.5	28.1	26.4	34.9	26.8	30.1	100	51.6	61.5	87.8	47.5	55.0	60.7	101
AES201	34.4	26.6	25.8	32.2	32.3	30.3	101	57.2	64.7	96.8	46.0	56.1	64.2	107
AES202	34.4	28.9	28.7	35.3	28.1	31.1	104	57.0	71.1	105.0	57.7	53.9	68.9	115
AES203	36.6	28.5	29.0	34.3	29.2	31.5	105	53.2	74.8	96.4	52.0	49.3	65.1	108
Minn.804	36.8	27.8	25.7	37.4	31.8	31.9	106	59.4	64.3	99.3	43.1	56.8	64.6	107
ND301	34.6	28.7	-	-	-	-	-	59.6	65.6	-	-	-	-	-
ND307	34.0	26.1	27.9	33.3	-	-	-	61.9	73.0	100.0	47.0	-	-	-
W273	38.5	-	30.1	34.3	-	-	-	58.4	-	93.3	46.9	-	-	-

	Root lodging %				Stalk breakage %				Rating 1 to 5			Ear	Rows	Corn
									Plants		Ears	lgth.	seed	care/p
	N.D.	Minn.	Mich.	Av.	N.D.	Minn.	Mich.	Av.	N.D.	Minn.	N.D.	Minn.	Minn.	Minn.
AES101	12.0	63.3	6.5	27.3	10.0	8.8	2.1	7.0	1.8	3	3.0	7.0	14	.90
W1640	12.1	20.0	1.8	11.3	10.2	11.6	0.0	7.3	1.5	3	3.0	6.7	14	.93
W240	32.0	65.2	8.5	35.2	14.5	29.0	7.2	16.9	3	-	3.4	8.0	12	.84
W1630	4.2	38.3	2.0	14.8	10.2	15.6	7.3	9.4	2	3	3.0	7.0	15	.83
AES201	5.2	41.7	0.0	15.6	2.9	9.5	0.5	4.3	1.5	2	2.5	7.3	15	.89
AES202	5.1	43.3	0.5	16.3	2.5	6.8	1.4	3.6	2.0	2	1.0	7.3	15	.93
AES203	2.0	25.0	0.7	9.2	1.5	9.0	0.5	3.7	1.5	2	2.5	7.8	15	.92
M804	2.0	16.7	0.0	6.2	3.5	11.5	0.0	5.0	1.5	3	1.5	7.3	14	.90
ND301	3.5	53.3	-	-	10.1	17.0	-	-	1.5	3	2.0	7.4	14	.93
ND 307	4.3	60.0	4.3	22.9	2.0	10.0	3.0	5.0	1.2	-	1.0	8.4	14	.90
W273	4.2	-	0.0	-	4.5	-	0.0	-	1.5	-	2.5	-	-	-

		Smut %		Husk-ing	Height in N.D.		Shelling %	
Hybrid	Pedigree	N.D.	Minn.	N.D.	Pl.	Ears	N.D.	Wis.
AES101	WDxND203:CMV3xW103	10.1	0.0	ME	76	22	83.5	81.8
W1640	CM3xW103: W59Ex W41A	8.0	0.0	E	78	24	85.8	84.6
W240	W9xWD : W85xW15	9.1	-	Mh	80	24	85.2	84.7
W1630	W291xW191B : W59ExW41A	2.2	1.6	E	80	26	86.3	86.3
AES201	W33xA116: A90xND203	6.4	1.0	Mh	86	30	82.7	81.7
AES202	CD5xW59M : A509xMs1334	2.4	0.0	Mh	84	26	81.7	80.5
AES 203	CD5xA509 : W59MxMS1334	2.1	0.0	M	86	26	80.6	80.0
Minn.804	A495xA509 : A502xA556	2.2	0.0	M	82	26	82.6	81.6
ND 301	ND230xND203 : A111xA90	1.1	0.0	M	78	26	81.6	-
ND 307	ND230xND203 : A90xMS1334	2.1	-	M	88	30	83.2	-
W273		1.1	-	E	86	28	85.0	83.5

The next meeting of the North Central Corn Breeding Research Committee was scheduled for the first week of March 1959. The exact date was to be settled at a later date depending upon the availability of a meeting place.

The meeting adjourned at 11:00 a. m.

MEETING OF THE EXECUTIVE COMMITTEE

The Executive Committee met immediately following the adjournment of the Corn Breeding Research Committee. Dr. L. H. Penny was elected Chairman for the 1959 meetings.

AFTERNOON SESSION, MARCH 5

The Corn Products Refining Company of Argo, Illinois had extended an invitation to the Corn Breeding Research Committee to visit their research center. The group desiring to make this trip left the LaSalle Hotel by bus and was taken to the Research Center. Dr. Watson and others gave a brief resume of the organization of the Corn Products Refining Co., and the various types of work in progress at the Center.

The Committee members were then divided into small groups with individual guides and visited the engineering development section, and the starch, protein and oil sections. This was followed by a coffee session and the group left by bus about 4:00 p. m., for return to Chicago.

-o-